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ARTICLE XXVII.

Notes on the Classification of the Carabidæ of the United States. By John L. Le Conte, M. D. Read March 18, 1853.

The object of the present investigation is, an attempt to classify the great family of Terrestrial Predaceous Coleoptera, in such a manner as to exhibit to some extent the natural affinities of the genera among themselves, and to establish natural groups, which may be recognised without the aid of sexual characters. In all the systems already proposed, however natural may be the mode of division, it is frequently a matter of impossibility to determine the genus, if the specimen should be a female; and in such cases we have nothing to aid us except the empirical characters derived from the general appearance of the insect.

The first attempt to establish such natural divisions in the family of Carabidæ is, apparently, the arrangement proposed by Erichson in his very philosophic and concise Käfer der Mark Brandenburg. This arrangement, with a different subordination of characters, and the introduction of some new considerations, forms the ground work of the classification herein contained. The isolated groups have been carefully examined and commented upon by Chaudoir, with great detail and accuracy, in various essays contained in the Bulletin of the Soc. Imp. des Naturalistes de Moscou: the great detail with which his descriptions are made, enables the student to form a very clear idea of the true affinities of his genera, although, perhaps, the differences upon which they are founded are occasionally suitable rather to define a group of species, than a natural genus.

The attempts at classification on the part of the French naturalists do not appear to have been equally successful. The standard work of Dejean shows evidence of this by the continual doubts expressed as to whether species described should belong to the genus in which they were placed, or to some other. Sometimes the same doubt is shown about the position of a genus, or even of a group of genera. The other French Entomologists, with but few exceptions, have adopted the system of Dejean, which was based upon earlier observations of Latreille. The classification proposed by Laporte in his Etudes Entomologiques, makes several very necessary innovations, but his characters are in general too loose and faulty to be useful, although the groups mostly appear natural. That of Brullé in the Suites à Buffon, possesses great merit, from the clearness of

his definitions, and from many happy suggestions regarding the affinity of difficult groups. The classifications adopted by English naturalists are mainly based upon Latreille's system, very slightly modified. That offered by Haliday (Entomologist, 185,) is a remarkable exception, the structure of the prosternum being for the first time used as a character for natural division in this tribe.

However applicable and satisfactory these arrangements may be when applied to a local fauna, they have all failed when applied to a more extensive series of genera, so that after all these systems, there are yet many genera, which, when placed in the groups with which they seem properly to belong, violate the rules of the system. Thus if Galerita enters Erichson's group *Brachinini*, it would be impossible for the nearly allied Helluo to do so; although these are certainly much more closely related than Brachinus and Lebia: while in other cases (Anchomenini, Pterostichini, Trechini, Chlæniini) the characters are almost entirely sexual.

The great difficulty, in all investigations of this nature, is the determination of the true value of the differences of organization, which are co-extensive with the groups: in proportion as these are properly subordinated our classification becomes natural. Having once established the limits of our smaller groups upon distinct characters, we may then use those which are dependent on sex, or other condition, for the purpose of investigating the relations existing among these groups. In proportion to the extent of a series, and the number of types existing in it, will be the difficulty of giving a clear limit to the variation of the series, and of furnishing a definition which will distinctly indicate such series.

The characters founded upon modifications indicating particular modes of life, are in general, I think, unsafe; because animals must be looked upon as machines, which work always in the most effective manner; and thus the habits of life would follow from the modifications of structure, which form part of the system of variation, and but rarely from those great and fundamental differences which distinguish the types in nature. Thus, for example, the division of birds into land birds and water birds, is eminently unnatural; for although it may be asserted, with some plausibility, that the webbed feet of the latter were given them *for the purpose* of enabling them to swim, no *earthly* reason can be given why the embryo of a land bird at an early stage of development should also have webbed feet, unless we stupidly shut our eyes to all provision or design in nature, and say: the animal lives in a liquid, and therefore it must have swimming organs, entirely irrespective of what may be its habits when fully developed. In mammalia this system of classification has long been discarded, and we find the aquatic species partitioned among the various groups, to which, by their assemblage of characters, they seem most closely allied, leaving only a small group, Cete, which are typically aquatic.

Applying similar considerations to the large series of pentamerous predaceous Coleoptera, I have been led to select other characters than those usually adopted for the division into Adephaga and Hydradephaga, which depend on the form of the feet. On closely investigating the nature of the parts supporting the feet, which assume this peculiar natatory form, I was delighted to find that the coxa showed a modification in form which has

heretofore been unnoticed. In the natatory genera, the posterior coxa is larger than in the terrestrial genera, and extends completely to the side of the abdomen, thus cutting off all articulation between the epimera of the metasternum and the ventral surface of the abdomen: now the effect of this is to give an increased attachment for the muscles moving the long posterior legs, so that they may have the requisite power for swimming. The teleologist might say that this was a simple effect of the natatory legs: unfortunately, however, there happens to be a genus found in California, which, with this form of coxa, (reduced only a little in size,) has perfectly ambulatorial feet, so that in this case it is evident that the enlarged coxa, a zoological character, having only indirect relation to the manner of life, has considerably more value in establishing the relations of the two organisms than the mechanical character of the form of the legs.

Leaving the full development of these considerations, which belong more properly to transcendental zoology, I will proceed to sketch out the general facts by which I have been guided in my arrangement of Geodephagous Coleoptera.

In the first instance we have two very distinct forms recognised by most entomologists as types of distinct families. These are the Cicindelidæ and ordinary Carabidæ. The definition of the first family has been gradually modified according to our more accurate knowledge, until finally it rests merely on the character proposed by Erichson, "ligula cornea, inflexa, paraglossis nullis." On close comparison I find that the antennæ are differently placed in the two families, being on the front above the base of the mandibles, in Cicindelidæ, and behind the base of mandibles in the genuine Carabidæ. Another very remarkable difference of a sexual character is, that the abdomen of the male is composed of seven ventral segments, while the female has but six, as in ordinary Carabidæ.

Having now isolated the Cicindelidæ, we may pass on to the consideration of the second family, as the very complete essay of M. Lacordaire* leaves nothing to be added. A classification of the numerous species found within our country requires a synopsis, and must be deferred for a more appropriate occasion.

In glancing over a large series of Carabica, it is evident at first sight that there are at least six distinct groups, viz., Lebia, Pterostichus, Harpalus, Chlænius, Scarites, and Carabus: although there may be gradations from one to the other, yet the eye singles these out as being the types of different divisions. In comparing these with each other we find a general correspondence of those characters which separate them from Cicindelidæ, but in the more intimate structures we find a great difference. The form of the anterior tibiæ has been used by Erichson, and of the sternum by Haliday: these appear so different in form in genera which are closely allied, that it is obvious that their importance in establishing the primary divisions has been unduly estimated. On comparing together the before-mentioned six types, I found that a character exists in the side-pieces of the mesosternum, which would give us a primary division apparently free from objection. In the ordinary Lebia, Pterostichus, &c., this side-piece is quadrilateral, with a fine scarcely perceptible suture along its posterior margin. In Scarites and Carabus this fine posterior suture,

* Revision de la Famille des Cicindélides, &c. Mem. Soc. Roy. des Sciences de Liége. Tom. 1.

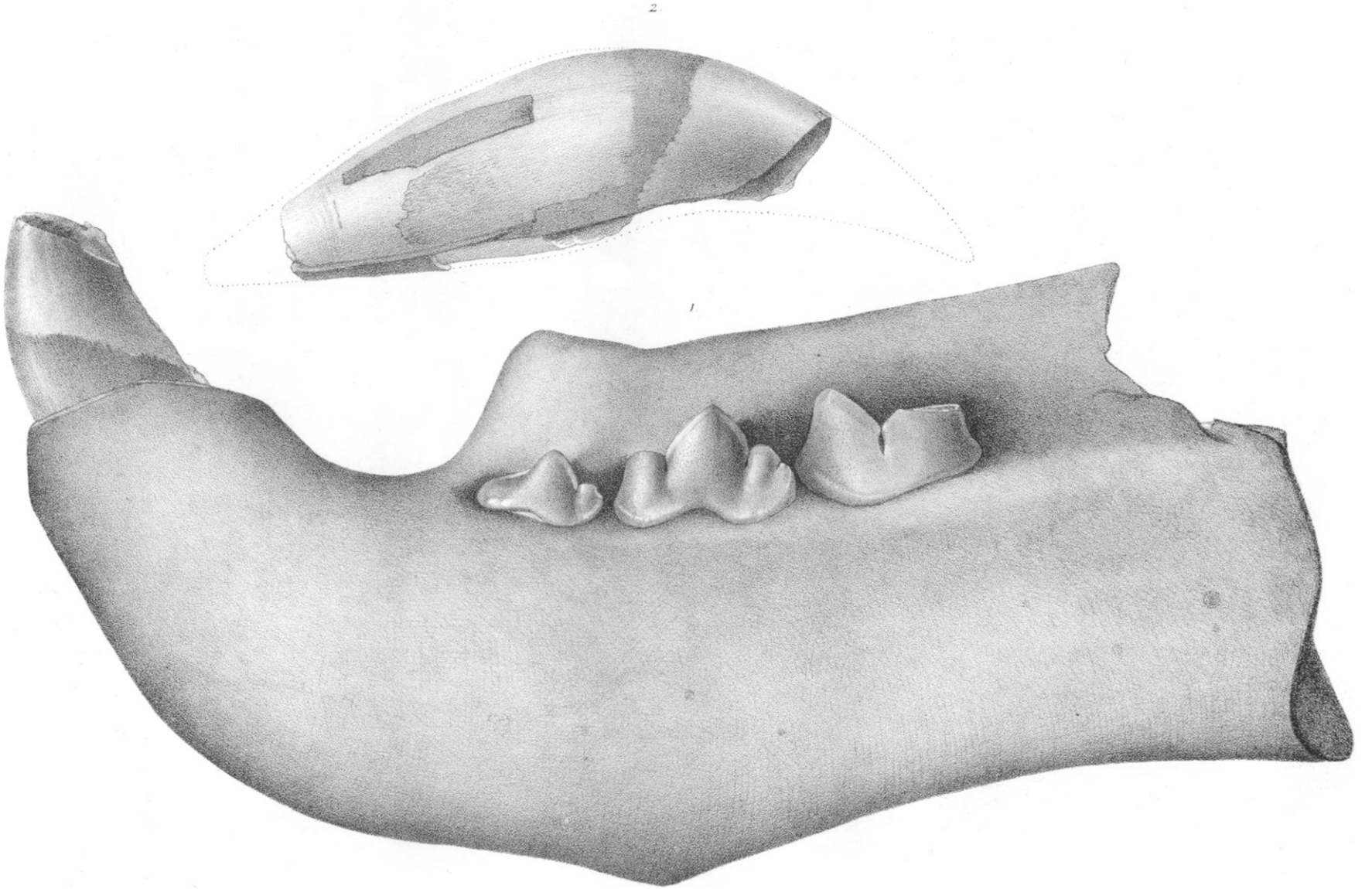
separating the epimera and episterna, is advanced so that the posterior portion becomes triangular, and the suture is diagonal. For convenience, in the descriptions which follow, I have termed these quadrangular pieces "epimera;" and although it is evident they are composed of the epimera and episterna together, it was thought that this term, though not strictly accurate, was obvious in its meaning, and preferable to the introduction of an unusual expression. The diagnosis of the first division will, therefore, be "epimera mesothoracis non diagonaliter divisa;" and, of the second, "epimera mesothoracis diagonaliter divisa."

In the isolation of the different types composing the first of these divisions, it was found that Erichson's definition of his group Brachinini, would not apply to many of our genera, which were evidently closely related with genera already contained in his group: it thus became necessary to seek for new characters. In comparing together the different genera with truncate elytra, it was seen that Brachinus, distinguished by its singular power of producing explosions, differed not only from all other genera with truncate elytra, but from all other Carabidæ, by having seven ventral segments in the abdomen; thus violating the diagnosis of the entire family, as given by Erichson. Yet it was evident that the Brachini did not constitute a separate family, of the same rank as the Cicindelidæ, but were rather to be compared with the two divisions already established on the form of the epimera of the mesothorax. In this respect the Brachini appeared to come closer to the second series than to the first.

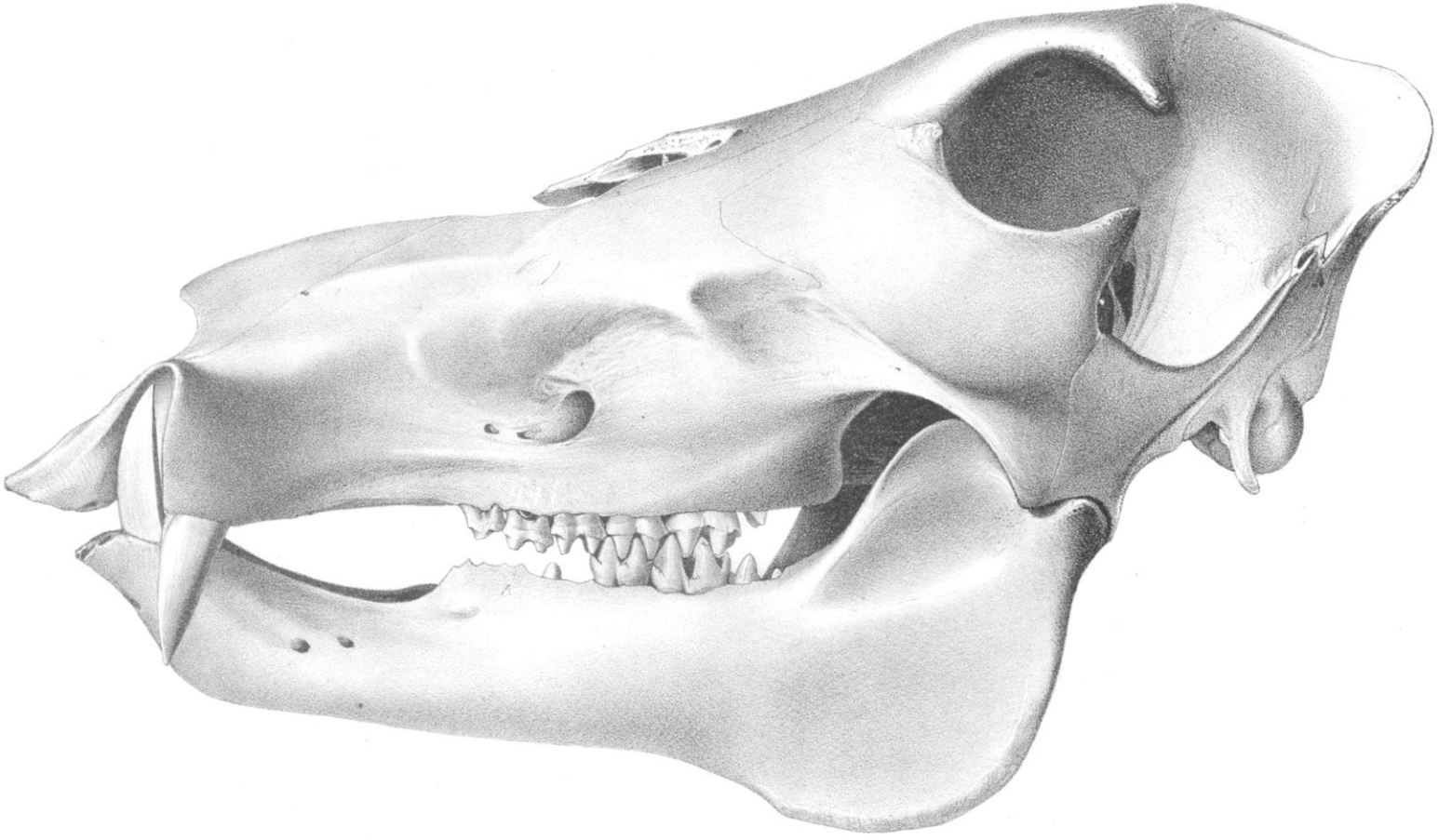
We now, therefore, have three sub-families, easily distinguished from each other, and which may be called Brachinini, Harpalini, and Scaritini.

In taking up the second of these, containing the great mass of the Carabidæ, and recurring again to those with truncate elytra, it was found that a certain set, typified by Lebia and Cymindis, passed by insensible gradations into those having the elytra not truncated, as Platynus, and thus to Pterostichus, all distinguished by having the anterior tibiæ slender, or but slightly thickened, while Helluo had the same organs broad and strongly compressed, so that both the truncate elytra and the structure of the anterior tibiæ failed to define the group. While comparing together Helluo with Galerita, no difference was perceived excepting those already pointed out; but, in comparison with Cymindis, the ligula was found to be destitute of the paraglossæ, which although connate with the ligula in the greater number of genera having truncate elytra, are still distinct. On further comparison this absence of paraglossæ was found to be a character of all the genera which were suspected to have any affinity with Helluo, such as Galerita, Anthia, Morio, however different might be the form of the tibiæ and elytra. This, then, was obviously a point of fundamental importance, since it brought together genera, the affinities of which had been recognised, although by the ordinary classifications they had been widely separated. On farther consideration I was induced to consider Panagæus as related with these genera, rather than with Chlœnius or Badister.

Another peculiarity which distinguishes this set of genera is the tendency to abnormal pubescence on the antennæ, the difference between the glabrous and pubescent points, so obvious in most of the Carabidæ, being here by no means plain: some genera, as Gale-



Felis atrox, Leidy.



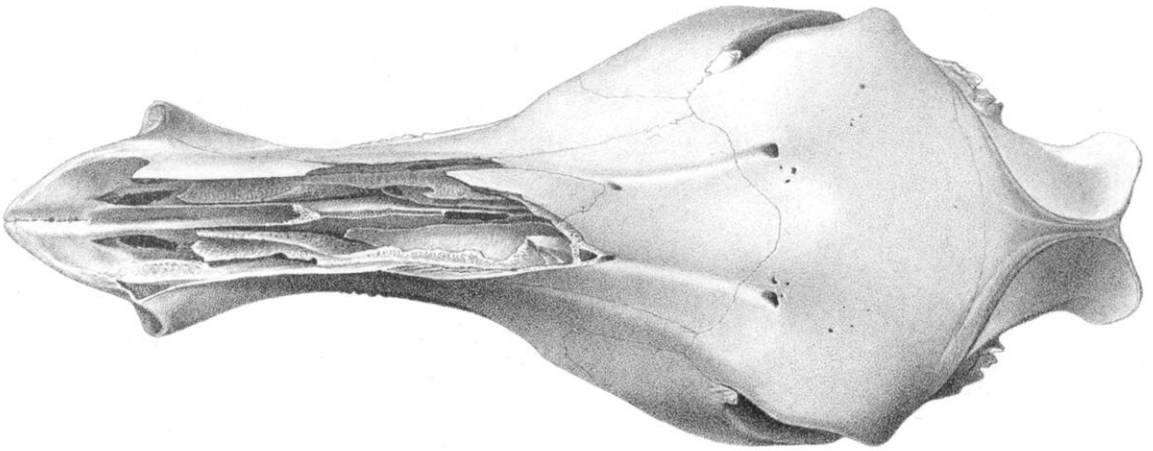
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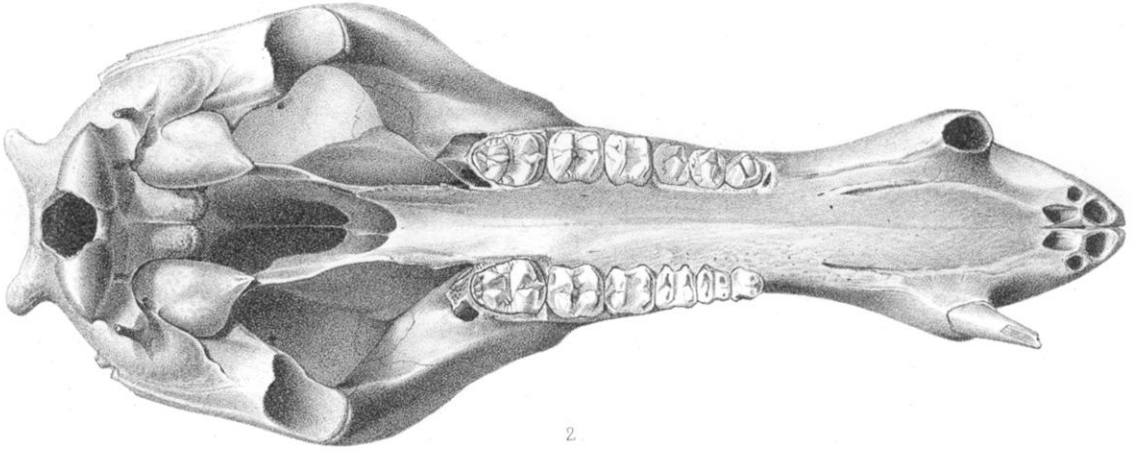
T. Sinclairs lith.

EUCHOERUS MACROPS. *Leidy*

1



1/2

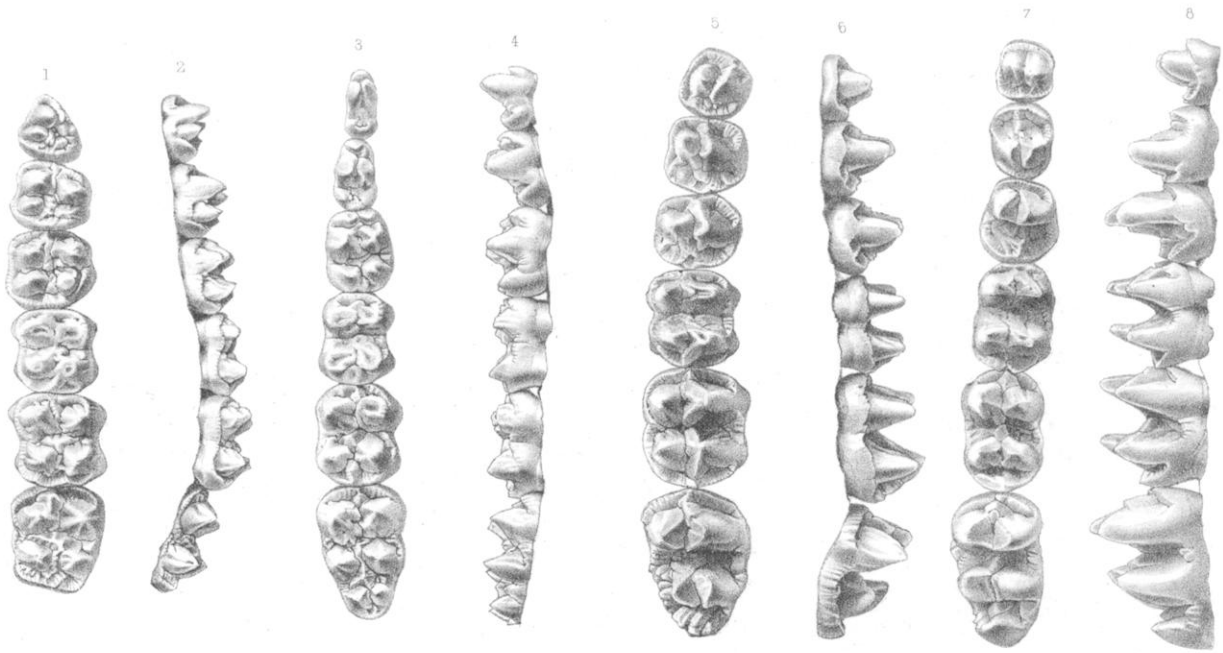


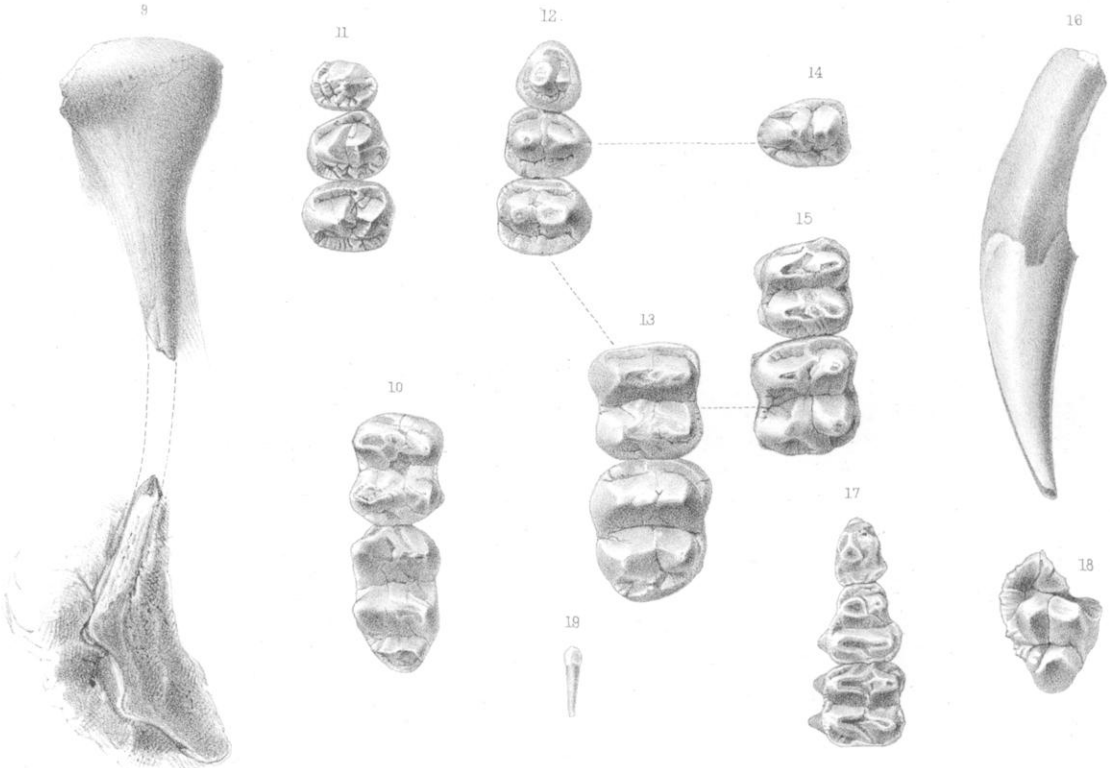
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T. Sinclair lith.

Euchoerus macrops Leidy.

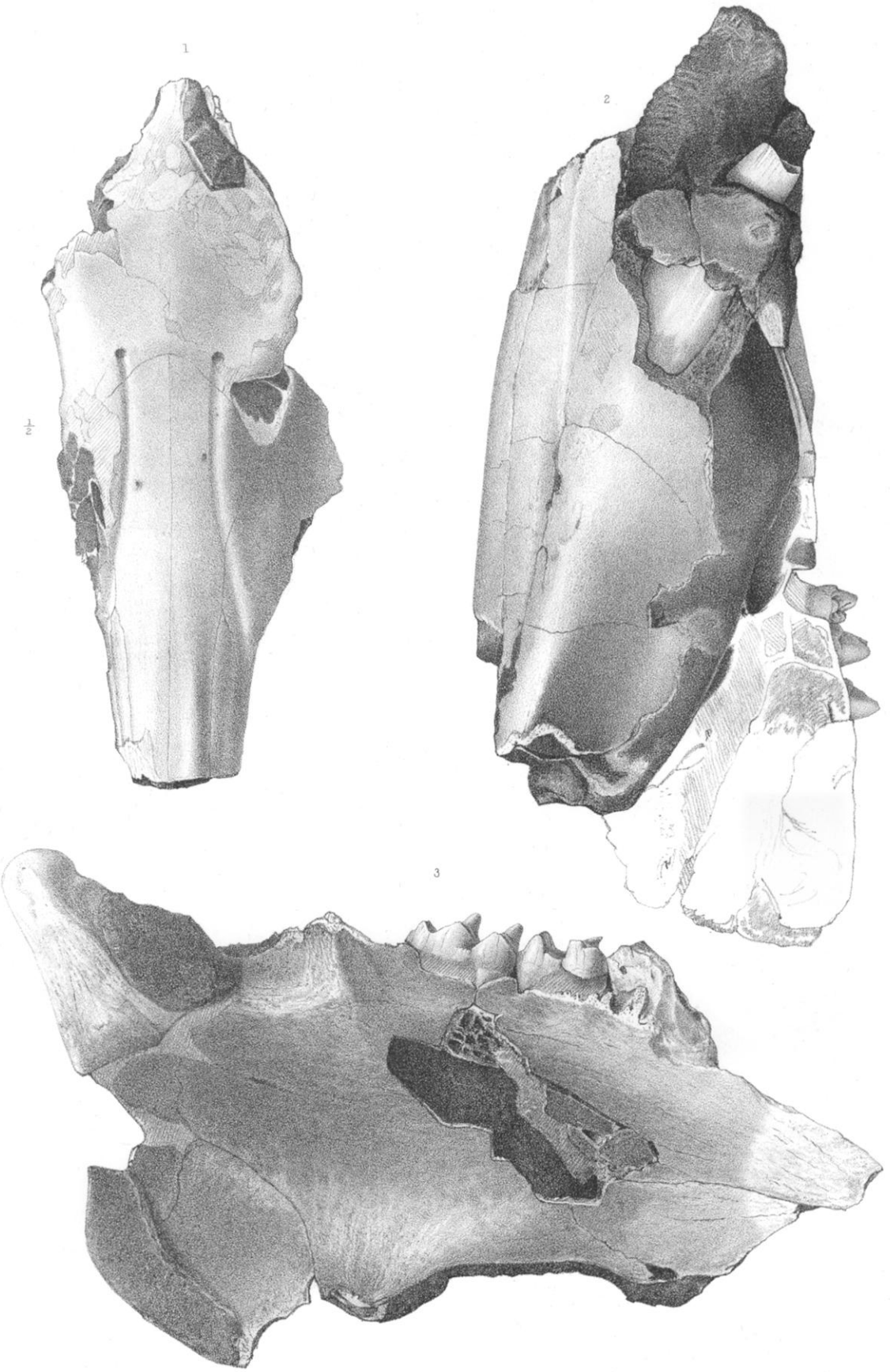




From nature by A. J. Ibbotson.

T. Sinclairs lith. Phil.

1–4. Dicotyles torquatus. 5–8, 17, 19, Euchoerus macrops.
9–16 Platygonus compressus. 18. Protochoerus prismaticus.



From nature by A. J. Ibbotson.

T. Sinclair lith. Phila.

1. Dicotyles depressifrons Le Conte.

2.3. Platygonus compressus Le Conte.

rita have the antennæ nearly equally hairy, while in Morio, the outer joints are much less pubescent than usual.

Having eliminated this set, which contains nearly all the anomalous genera of difficult location, our task was reduced to finding sufficient differences to isolate the three remaining types, Pterostichi, (including Lebia,) Harpalus, and Chlœnius: after trying every means in my power, I have been compelled to rest the first and third almost upon sexual characters, which are here co-extensive with each group: the second group cannot rest upon sexual characters, as we there find such structures variable, not only in allied genera, but even in the same genus: the only character found to distinguish it, is, that the third joint of the antennæ is more or less pubescent, while in all the genera of the other two groups, with the exception of Badister and some genera allied to Casnonia, that joint is entirely glabrous. This difference is not altogether satisfactory, but it seems to be the best that can be obtained, and if we find the groups into which these divisions may be separated so distinct that there will be no possibility of confounding them, we may use these slight characters as indicating the existence of affinities in series, which series, although manifest in nature, cannot be defined.

The diagnosis of the groups, as subsequently given, will show that such has been done, and that the groups themselves rest upon characters independent of sexual modifications. The only cases in which confusion can arise, are in the osculating instances just mentioned: where the Lachnophori osculate with Galerita, and Badister with Stenolophus. Between Chlœnius and Pterostichus there is an osculation also, so that for the separation of these groups we must rely on the empirical character that the Chlœnii are all pubescent, and the Pterostichi glabrous.

Passing now to the third subfamily, Scaritini, we find in it the following types, which are obviously distinct: Ozæna, Scarites, Bembidium and Carabus, besides Broscus and its allies, and Omophron, the position of which might be questionable.

The differences in the parapleuræ cannot yet be employed, for in the allies of Scarites we find great variations: the form of the prosternum must also be postponed, for Elaphrus and Omophron are both close relations of Notiophilus.

The tibiæ, however, present important differences, those of Scarites being produced very much at the external apical angle, giving rise to the form that is called palmated: in this group, and in one or two genera (Promecognathus) which, though not belonging to the group, show very great affinities with it, the parapleuræ are unusual in form, so that throwing out for the present Promecognathus, we can get good definitions for the four principal types, Ozæna, Scarites, Benbidium, and Carabus.

With regard to Omophron, on examination, there is found to be no important difference between it and Elaphrus, except in the form of the sternum; and as we already know the variations in that part of the body by comparing Elaphrus and Notiophilus, it is safer to place Omophron with the Carabi, to which its simple anterior tibiæ and parapleuræ show its affinity. With regard to the remaining genera not included in the four groups, they are Promecognathus, Metrius, Broscus, and Haplochile, and some foreign genera, considered as osculant between Morio and Ozæna, with both of which indeed they

seem to have strong affinities; by the form of their epimera, however, they belong to the present subfamily, and only indicate an osculation with the first division of the second subfamily.

Promecognathus, by the form of the mandibles, labrum, in short of every part of the body except the legs, indicates an affinity with Scarites: Broscus appears to be related to Promecognathus, by the antennæ, ligula, and legs, but differs in the parapleuræ being appendiculate: Metrius agrees with Broscus in every respect except form of body; the thorax being closely united to the trunk, and the prosternum produced posteriorly as in the Carabi. Haplochile leads off towards Morio, and Ozæna, differing from the latter by the form and insertion of the antennæ, but agreeing in these organs with Metrius. In view of these affinities, I have classed all these genera in one group, placed between Ozæna and Scarites, and distinguished by having the four basal joints of the antennæ glabrous, and the anterior tibiæ emarginate and not palmated. The distinctions between them and the Carabi are not obvious, as one genus of the latter, Loricera, has the anterior tibiæ tolerably deeply emarginate. In the case of the genera of Carabi allied to Loricera, the base of the maxillæ is strongly spinous or bearded, while in Promecognathus nothing of the kind is seen. This will furnish an unfailing mode of distinguishing the two groups where the diagnosis seems imperfect.

Besides the osculation between the Psydri and Moriones of the preceding subfamily, there is also an osculation between the Bembidia and the Pterostichus series through the Trechi: this osculation is so close that Patrobus seems equally well placed in either division: this genus and Pogonus are the only ones which I have seen in which the application of my method of arrangement leads to doubtful results. The other genera of Scaritini show no approximation towards the groups of the preceding division, except in the relation between Cychrus and Panagæus: the relation between Ditomus and Scarites seems to me to have been much exaggerated.

The point of osculation between the Carabidæ and Cicindelidæ seems to occur in this subfamily, in the Elaphri: a nearly allied genus of the Carabi (Opisthius) furnishes the nearest approach to an osculation with the water beetles.

ADEPHAGA.

Coleoptera pentamera, prothoracis epimeris et episternis distinctis; abdominis segmentis tribus primis connatis.

Subseries 1. Coxæ anticæ globosæ in prosterno sitæ, posticæ ad abdominis marginem non extensæ: *Cicindelidæ* et *Carabidæ*.

Subseries 2. Coxæ anticæ præcipue globosæ, raro transversæ, inter prosternum et mesosternum insertæ; coxæ posticæ ad abdominis marginem extensæ: (pedes postici sæpissime natatorii :) *Amphizoidæ*, *Haliplidæ*, *Dytiscidæ* et *Gyrinidæ*.

Fam. 1. CICINDELIDÆ.

Antennæ in frontem supra mandibularum basin insertæ, articulis 4 primis glabris; ligula brevissima inflexa, palporum labialium stipite libera: tibiæ anticæ tenues non emarginatæ;* abdomen maris 7-, feminæ 6-articulatum.

Fam. 2. CARABIDÆ.

Antennæ ad mandibularum basin sitæ, articulis basalibus plus minusve glabris: ligula porrecta, paraglossis sæpissime distinctis: abdomen sexus utriusque conforme.

Subfam. 1. *Brachinini.*

Abdomen sexus utriusque 7-articulatum: epimera mesothoracis fere diagonaliter divisa; parapleuræ appendiculatæ: tibiæ anticæ tenues emarginatæ.

Subfam. 2. *Harpalini.*

Abdomen sexus utriusque 6-articulatum; epimera mesothoracis non diagonaliter divisa, parte posteriore brevissima: parapleuræ appendiculatæ; tibiæ anticæ emarginatæ.

A. *DRYPTÆ.*

Tibiæ anticæ tenues vel dilatatæ, apice non spinulosæ.

Antennæ art. 4 primis plus minusve glabris.

Ligula dilatata, paraglossis nullis.

Tarsi maris, quando dilatati, papillis raris instructi.

B. *PTEROSTICHI.*

Tibiæ anticæ tenues, vix spinulosæ, vel apice incrassatæ et spinulosæ.

Antennæ art. 3 glabris, rarius 4 subglabris.

Ligula paraglossis distinctis.

Tarsi maris antici dilatati, subtus papillis seriatis instructi.

C. *HARPALI.*

Tibiæ anticæ incrassatæ, plus minusve spinulosæ.

Antennæ articulis 2 glabris.

Ligula paraglossis distinctis.

Tarsi maris varii.

D. *CHLÆNII.*

Tibiæ anticæ plus minusve incrassatæ.

Antennæ articulis 3 glabris.

Tarsi maris articulis dilatatis subtus dense spongiosis.

Ligula paraglossis distinctis.

Subfam. 3. *Scaritini.*

Abdomen sexus utriusque 6-articulatum; epimera mesothoracis diagonaliter divisa: (parapleuræ sæpe non appendiculatæ, et tibiæ anticæ simplices.)

* Erichson (Käfer der Mark Brandenburg) says that the parapleuræ in this family are without any posterior appendage. I find this character very uncertain, as in some species (e. g. C. *purpurea*) the appendage, though small, is very distinct. In *Omus Californicus* there is hardly a trace of it, and in *O. Dejeanii* it cannot be seen at all.

E. *OZÆNÆ.*

Parapleuræ appendiculatæ.
Tibiæ anticæ emarginatæ, truncatæ.
Paraglossæ latissimæ, connatæ, distinctæ.
Antennæ sub frontis lateribus insertæ.

F. *BROSCI.*

Parapleuræ variæ.
Tibiæ anticæ truncatæ, emarginatæ.
Ligula dilatata, paraglossæ angustæ, rarius elongatæ.
Antennæ articulis 4 glabris.
(Maxillæ basi non spinosæ.)

G. *SCARITIDES.*

Parapleuræ variæ.
Tibiæ anticæ emarginatæ, palmatæ.
Paraglossæ distinctæ, apice liberæ.

H. *BEMBIDIA.*

Parapleuræ appendiculatæ.
Tibiæ anticæ emarginatæ, truncatæ.
Paraglossæ distinctæ apice liberæ.
Antennæ articulis 2 glabris.

I. *CARABI.*

Parapleuræ non appendiculatæ.
Tibiæ anticæ vix emarginatæ.
(Maxillæ præcipue basi spinosæ.)

A. *DRYPTÆ.*

a. *Galeritæ.*

Caput postice constrictum.
Elytra truncata.
Tibiæ anticæ tenues.
Antennæ articulo 1mo elongato.

b. *Helluones.*

Caput postice modice constrictum.
Elytra abbreviata, subtruncata.
Tibiæ anticæ compressæ dilatatæ.

c. *Moriones.*

Caput postice modice constrictum.
Elytra integra.
Tibiæ anticæ compressæ dilatatæ.

(c′. *Apotomi.*)
(c″. *Anthiæ.*)

d. *Panagæi.*

Caput postice sæpissime constrictum.
Elytra integra, punctis ocellatis nullis.
Tibiæ anticæ non dilatatæ.

B. *PTEROSTICHI.*

e. *Lachnophori.*

Caput postice constrictum.
Thorax pedunculatus.
Elytra vix truncata, stria 9na ambiente.
Palpi apice acuminati.
Tibiæ anticæ tenues, ungues simplices.
(Tarsi maris non dilatati.)

f. *Odacanthi.*

Caput rhomboideum, postice constrictum.
Thorax elongatus.
Elytra truncata, vel subtruncata.
Palpi labiales filiformes.
Tibiæ anticæ tenues; ungues varii.

g. *Lebiæ.*

Caput sæpe postice constrictum.
Elytra valde truncata.
Tibiæ antice tenues; ungues varii.

h. *Trechi.*

Caput postice non constrictum.
Elytra integra, stria 8va interrupta.
Tibiæ anticæ variæ; ungues simplices.
(Antennæ sæpe articulis basalibus subglabris.)

i. *Platyni.*

Caput postice non constrictum.
Elytra non truncata, stria 8va integra.
Tibiæ anticæ tenues, ungues varii.

k′. *Stenomorphi.*

(Mentum non dentatum.)

k′. I have slightly examined a South American species of Stenomorphus, without, however, being convinced that the genus should form a separate group. All the genera of (k) known to me have a tooth in the middle of the emargination of the mentum, and this appeared to be the only difference.

k. *Pterostichi* (genuini.)
Caput postice non constrictum.
Elytra integra, stria 8va integra.
Tibiæ anticæ apice incrassatæ et spinulosæ.
(Mentum medio dentatum.)
(Corpus glabrum.)

C. *HARPALI.*

l. *Harpali* (genuini.)
Abdomen non pedunculatum.

(l'. *Ditomi.*)

D. *CHLŒNII.*

m. *Licini.*
Labrum impressum.
Mentum non dentatum.
Elytra punctis ocellatis solitis.

n. *Chlœnii* (genuini.)
Labrum planum.
Mentum medio dentatum.
Elytra punctis ocellatis solitis.
(Corpus valde pubescens.)

o. *Oodides.*
Labrum planum.
Mentum medio dentatum.
Elytra punctis ocellatis margini contiguis.

E. *OZÆNÆ.*

p. *Pseudomorphi.*
Elytra truncata, margine non interrupto.

(p'. *Ozænæ.*)
(Elytra integra, sulco marginali interrupto.)

(p''. *Siagonæ?*)

F. *BROSCI.*

q. *Psydri.*
Tibiæ anticæ emarginatæ truncatæ.
Parapleuræ appendiculatæ.
Prosternum non productum.

r. *Metrii.*
Tibiæ anticæ emarginatæ, truncatæ.
Parapleuræ appendiculatæ.
Prosternum postice productum.

p'. I have had no opportunity of examining this group, but from figures and remarks by various authors I have no doubt of its near relationship with Ozœna.

r'. *Brosci* (genuini.)
(Parapleuræ appendiculatæ.
Prosternum postice non productum.
Thorax pedunculatus.)

s. *Promecognathi.*
Parapleuræ non appendiculatæ.
Tibiæ anticæ emarginatæ, truncatæ.
Prosternum non productum.
(Labrum breve, sinuatum.)

G. *SCARITIDES.*

t. *Scaritides* (genuini.)
Parapleuræ variæ.
Tibiæ anticæ emarginatæ palmatæ.
Antennæ articulo 1mo longissimo.

u. *Clivinæ.*
Parapleuræ appendiculatæ.
Tibiæ anticæ emarginatæ, palmatæ.
Antennæ articulo 1mo non longiore.

H. *BEMBIDIA.*

v. *Bembidia* (genuina.)
Parapleuræ appendiculatæ.
Tibiæ anticæ emarginatæ truncatæ.
Antennæ filiformes, articulis 2 glabris; 3io subglabro.
(Palpi sæpissime subulati.
Elytra stria marginali integra.)

I. *CARABI.*

x. *Carabi* (genuini.)
Tibiæ anticæ non emarginatæ.
Acetabula antica postice hientia.
Mesosternum detectum.

y. *Elaphri.*
Tibiæ anticæ emarginatæ, vel simplices.
Acetabula antica integra.
Mesosternum detectum.

z. *Omophrones.*
Tibiæ anticæ vix emarginatæ.
Acetabula antica integra.
Mesosternum prosterno dilatato obtectum.

Subfam. 1. BRACHININI.

Abdomen of both sexes with seven segments.

This subfamily consists of a single group, composed of three genera, of which Brachinus alone is found within our territory. The species of these genera possess the singular power of emitting with great force a highly volatile and corrosive liquid, so as to produce a slight explosion. It is said that the genus Ozæna (group p'.) also possesses this power, but as Brachinus differs from all other Carabica in the number of abdominal segments, we must admit with great caution that any genus not agreeing with it in that respect, should have this explosive power: it is necessary that the phenomenon should be confirmed by the most careful observation, before it can be admitted. The statement formerly made by me of the explosive power of a species of Galerita is incorrect.

In this group the ligula is narrow, the paraglossæ broad, distinct, and connate with the ligula: the mentum has a basal membrane in the emargination, as in Lebia: the first three joints of the antennæ are smoother than the others, though not glabrous: the anterior tibiæ are almost filiform, emarginate internally: the epimera of the mesothorax are divided by a suture, which is almost diagonal, and much anterior to the position in which it is found in the second subfamily: the parapleuræ are distinctly appendiculate: the elytra are broadly truncate.

From this assemblage of characters this subfamily appears to be more closely allied to the Lebiæ than to any other group of the next subfamily.

Our species of Brachinus are similar to each other in form and colour, and differ by very slight characters. They are described at length in the Annals of the Lyceum of Natural History of New York, Vol. 4. Although willing to admit that the number of species there described is too great, yet, after repeated trials, I have failed to find any good characters by which to distinguish them, and I can therefore at present add nothing satisfactory on the subject.

Subfam. 2. HARPALINI.

Abdomen of both sexes with six segments: epimera of mesothorax not diagonally divided.

a. *Galeritæ.*

The characters of this group in its division, are sufficiently obvious in the diagnosis before given: the first four joints of the antennæ, though hairy, are less so than the following joints: the first joint is much the longest.

Our genera may be thus arranged.

A. Caput collo tenui thoraci junctum:

Antennæ setaceæ - - - - - - - - - - - -	Galerita *Fabr.*
Antennæ filiformes, articulis 3^{io} 4toque sequentibus æqualibus - - -	Zuphium *Latr.*

B. Caput collo crassiore thoraci iunctum:

Antennæ filiformes, articulo 3^{io} 4to breviore, et 2^{ndo} æquali; thorax basi truncatus,	Diaphorus *Dej.*
Antennæ variæ, articulis 2—4 æqualibus; thorax basi sub-pedunculatus, -	Thalpius *Lec.*

Thalpius is very closely allied to Diaphorus, and forms the transition from this to the next group: the anterior tibiæ, though thicker than in Galerita, are not compressed and dilated as in Helluomorpha; the terminal spurs are obsolete. The first joint of the antennæ is as long as the three following; the succeeding joints are equal in size, and vary in form in the different species: in the type T. p y g m æ u s, they are almost square, with rounded angles, so that the antennæ become moniliform. The palpi are as in Diaphorus, the maxillary dilated, the labial small and filiform: the mentum tooth is broad and indistinct: the first joint of the posterior tarsi is as long as the three following. The body is elongated, and the sides of the elytra are parallel.

The genus Enaphorus *Lec.* (Ann. Lyc. 5, 173,) founded on a Californian species E. r u f u l u s, must be suppressed, as it differs from Thalpius only in the form of the antennæ, which are more filiform, and less compressed.

The type of Thalpius is T. p y g m æ u s *Lec.* (Ann. Lyc. 5, 173,) which is Helluo pygmæus *Dej.* (Sp. Gen. 2, 460.) A nearly allied species was given me by Mr. Guex, as coming from Louisiana, which may be Diaphorus dorsalis *Brullé*, as from my friend Dr. Schaum, I learn that that species is very closely allied to the one just mentioned. The three species may be thus defined:—

1. T. p y g m æ u s, elongatus, valde punctatus, fuscus, pubescens, elytris convexiusculis, cribrato-striatis, interstitiis uniseriatim punctatis, basi late obsolete rufa; pedibus palpis antennisque flavis, his brevioribus articulis fere rotundatis. Long. ·2.

2. T. d o r s a l i s, elongatus, rufo-testaceus, valde punctatus, pubescens, elytris planiusculis, cribrato-striatis, interstitiis uniseriatim punctatis, macula communi postica infuscata, pedibus pallidis, antennis capite thoraceque longioribus, articulis oblongis. Long. ·2.

3. T. r u f u l u s, depressus, rufo-testaceus, valde punctatus, pubescens, elytris planis, subtilius striatis, interstitiis confuse punctatis, antennis capite thoraceque longioribus, articulis oblongis. Variat sutura postice infuscata. Long. ·22.

b. *Helluones.*

This group differs from the preceding, principally by the broader anterior tibiæ, and shorter first joint of antennæ: the elytra are shorter than the abdomen, but broadly rounded at the extremity. The affinity between this group and the Anthiæ has been already observed by Chaudoir. (Bull. Mosc. 1850.)

The only genus found in the United States is Helluomorpha *Lap.*, with the labrum large, concealing the mandibles, and the antennæ strongly compressed and thickened externally. The four described species are very uniform in appearance, and apart from size and colour may be best distinguished by the proportions of the joints of the antennæ. The anterior tarsi of the males are scarcely dilated. The two following species are new.

1. H. f e r r u g i n e a, depressa, obscure ferruginea, capite thoraceque valde punctatis, hoc lateribus antice rotundatis, postice subsinuatis, basi perparum angustato, angulis posticis obtusis, elytris thorace latioribus, sulcis minus profundis confuse punctatis, interstitiis vix parce punctatis, antennis capite thoraceque longioribus, articulo 4to vix dilatato, sequentibus non transversis. Long. ·6.

Texas; Lieut. Haldeman and Mr. Lindheimer. Except by the form of the antennæ, this species almost exactly resembles H. praeusta and laticornis; the thorax is, however, less narrowed posteriorly.

2. H. texana, piceo-ferruginea, depressa, caput thoraceque valde punctatis, hoc lateribus antice rotundatis, postice angustato et lateribus sinuato, angulis posticis obtusis, elytris thorace latioribus, sulcis minus profundis biseriatim punctatis, interstitiis lævibus, antennarum articulo 4^to^ triangulari, sequentibus quadratis vix transversis. Long ·7.

One specimen, Texas; Lieut. Haldeman. By its general form and structure of the antennæ this species resembles strongly H. praeusta but the grooves of the elytra have each two regular series of punctures, while in all our other species the punctures are confused.

c. *Moriones.*

A group of very difficult location, as it shows very strong resemblance to the Pterostichi and Harpali in its external form: from the form of the anterior tibiæ, and the antennæ, and from the absence of paraglossæ, and the dilatation of the ligula, its true affinities appear to be with the Helluones, from which it differs chiefly in having the elytra as long as the abdomen. In the only species of the group found in our country M. monilicornis, the antennæ are less broad and less hairy than in Helluomorpha, the first four joints are shining, with only a few hairs at their extremity; the following joints are broader, nearly square, glabrous on their flat sides, pubescent near the edges. The anterior tibiæ are compressed and dilated, the external angle is slightly produced: the tarsi are short and compressed, those of the male are not dilated. The series of punctures adjacent to the 8th stria of the elytra is distinct, and the 9th stria posteriorly diverges from the margin.

This last character, with the slight posterior constriction of the head, serves well to distinguish this group from any Pterostichi or Harpali to which it may be supposed to be allied.

Morio pygmæus *Dej.* is no Morio. I have formed of it the genus Haplochile, which will be found in group (q.)

d. *Panagæi.*

A great innovation is here proposed, by associating the Panagæi in close relationship with the Anthiæ. Yet on examination, I have failed to discover any reason for associating them with Chlœnius, as most authors have done, or with Loricera and Badister as Erichson has proposed.

The group *Licinini* of Erichson seems to me so completely artificial that I have discarded it. By his definition it differs from *Chlœniini* only in having the paraglossæ connate with the ligula, while in the form and proportions of these same organs we find great differences. By this means we have Badister and Licinus widely separated from Dicælus, and associated with Panagæus and Loricera, which seem to have as little affinity with each other as with any of the genera above mentioned. The last genus by its structure and habits belongs to the Elaphri, in the neighbourhood of Blethisa.

It would be rash to attempt to fix the characters of the present group definitely without

a careful examination of the foreign species, some of which seem by description to indicate a relation towards Cychrus. Ferté has separated under the name Isotarsus certain species in which the anterior tarsi of the males are not dilated, but without indicating any other characters by which they can be distinguished. The form of the head, heretofore considered sufficient to separate Panagæi from the other sections of "Patellimanes," has ceased to be diagnostic by the discovery of Eugnathus, below described.

The detail of the following characters, common to our two genera, may aid future investigation in endeavouring to fix the characters of the group.

The third joint of the antennæ is not glabrous, though a little smoother than the fourth. The mentum is smaller than usual, narrowed in front, and less deeply emarginate, with a tooth in the middle of the emargination; the ligula is corneous, apparently truncate, without distinct paraglossæ; the palpi are long and more or less dilated according to species; the thorax is constricted at base, and the abdomen almost pedunculated; the posterior appendage of the parapleuræ is very indistinct, the anterior tibiæ are emarginate as usual, scarcely thickened at the extremity: the dilatation of the anterior tarsi of the male is confined to the first two joints, which are spongy beneath. The body above and beneath is strongly pilose and punctured; the striæ of the elytra are normal in position, but the series of ocellate punctures near the 8th stria is not visible. Our genera are as follows:—

Caput postice constrictum, mandibulæ breves acutæ -	Panagæus *Latr.*
Caput postice non constrictum, mandibulæ crassæ dilatatæ	Eugnathus *Lec.*

Of Panagæus we have two species; P. c r u c i g e r u s *Say*, and P. f a s c i a t u s *Say*. Trans. Am. Phil. Soc. 2, 69.

EUGNATHUS *Lec.*

Caput obtusum, postice non constrictum; mandibulæ crassæ, dilatatæ, supra concavæ apice deflexæ, obtusæ; labrum parvum, inter mandibulas supra situm, transversum, antice rotundatum; palpi longiusculi, articulo ultimo ovali truncato; thorax postice sensim valde angustatus sub-pedunculatus, abdomen pedunculatum, a thorace remotum.

The other characters as in Panagæus; the male is unknown, the only species of the genus is Panagæus distinctus *Hald.* (Stansbury's Exped. 373) for the typical specimen of which I am indebted to my friend S. S. Haldeman. It was found near Sta. Fe, New Mexico, and may be thus defined:—

E. d i s t i n c t u s, rubens, flavo-pilosus, capite, thoraceque grosse punctatis, hoc transverso, obovato, postice valde angustato, lateribus valde rotundatis, elytris dorso subdepressis, striis valde cribratis, macula transversa nigra utrinque ad medium ornatis, apice summa, pedibus, ore antennisque piceis, his articulo 1mo rufo. Long. ·3.

e. *Lachnophori.**

On account of the acuminate palpi, these little insects have usually been associated with Bembidium, and in describing the genus Ega, Laporte, with his accustomed quickness of

* Only two genera, Lachnophorus and Ega are found in the United States: two species of each genus are, however, one on each side of the continent.

The species of this group are found running on wet mud, usually in grassy places, and are abundant in these localities The anterior tarsi of the males are not dilated.

observation, has stated the last joint to be small and subulate: had he taken the trouble to observe the number of joints preceding his last joint, he would have seen that the latter was no joint at all, but merely the obliquely pointed apex. Chaudoir seems to have been the first to separate them into a distinct group, without, however, pointing out the precise characters by which they may be distinguished, and without any remarks upon their affinities, which are, indeed, extremely obscure; Solier has placed them near Casnoniæ. To the insects of the preceding division they have but little resemblance, although there is a slight analogy to be found in Diaphorus, not only in the form of the head and thorax, but also in the extension of the 9th stria of the elytra around the apex, so as to meet the sutural stria. The paraglossæ are linear, and much longer than the ligula.

f. *Odacanthæ.*

This is the first of the numerous groups of this division, the principal common character of which seems to be that the three basal joints of the antennæ are evidently of a different nature from the others, more polished, and usually entirely glabrous. The chief exceptions to this last character are found in the present group, where, in some of the genera, the antennæ are hairy even to the base, but by close inspection the difference in appearance between the 3d and 4th joint can always be recognised. In this series, this group is readily known by the large rhomboidal head inserted into the thorax by a small neck, and by the long and cylindrical thorax. The form of the elytra is variable, but they are always truncate to some extent: the anterior tibiæ are slender, and not spinous at the tip; their spurs appear distinct: the tarsi are sometimes broad, sometimes narrow, their fourth joint is more or less emarginate: the claws are variable in form.

Five species are cited as inhabiting the United States: Casnonia Pensylvanica and Leptotrachelus dorsalis, are the only ones known to me: the others are C. p i c t a *Chaud.*, Bull. Mosc., 1848, C. l u d o v i c i a n a *Sallé*, Ann. Ent. Soc. Fr. 1849, and C. r u f i p e s *Dej.* The last is placed by Chaudoir in his genus Apiodera.

g. *Lebiæ.*

A very extensive group, comprising the greater part of the "Truncatipennes" of Dejean, and consisting of insects, which, though somewhat differing in form, are related by very strong joints of resemblance, and connected by insensible modifications of structure. The elytra are always truncate at the extremity, and the anterior tibiæ are slender and scarcely spinous at the extremity: their terminal spurs are sometimes distinct, sometimes obsolete. The first three joints of the antennæ appear to be always very smooth and glabrous. The head, tarsi, and ungues are variable in form, even among closely allied genera. The anterior tarsi of the male are slightly dilated, and furnished beneath with series of papillæ. The maxillary palpi are always filiform.

For the more convenient analysis of the genera, we may divide the group into three tolerably well defined portions.

Mentum dente medio indistincto, membrana basali velato.

1. Caput postice constrictum; palpi labiales non dilatati.
2. Caput postice vix constrictum; palpi præcipue acuminati.
3. Mentum dente magno, distincto: palpi maxillares semper truncati: labiales dilatati: caput postice vix constrictum.

The first division contains species living mostly on plants: the strongly constricted head sufficiently distinguishes them at first sight: the basal membrane of the ligula is thickened so as to fill up the emargination of the mentum, so that it becomes very difficult to determine if a tooth be really present: the maxillary palpi are cylindrical in our genera, and very slightly truncate at tip. They are thus related:—

Tarsi dilatati, subtus spongiosi: thorax basi truncatus - - -	Plochionus *Dej.*
Tarsi dilatati, subtus spongiosi: thorax pedunculatus - - -	Lebia *Latr.*
Tarsi filiformes, thorax pedunculatus - - - - - -	Didetus *Lec.*
Tarsi filiformes, thorax postice dilatatus, truncatus - - -	Nemotarsus *Lec.*

In two of our species of Lebia (g r a n d i s and a t r i v e n t r i s,) the first three joints of the anterior tarsi of the male are obliquely dilated, as in Galerita: after a very careful examination, I can find no character of sufficient importance to separate them as a distinct genus: the mentum tooth appears somewhat larger and more prominent, but this is a deceptive character in the present group.

DIDETUS *Lec.*

Caput pone oculos rotundatum, basi constrictum, collo tenui cylindrico; labrum amplum, antice rotundatum, mandibulas fere obtegens; palpi maxillares labialibus sesqui longiores, articulo ultimo præcedente fere duplo longiore, leviter ovali, acuminato: antennæ filiformes, articulis subæqualibus, 2^{ndo} paulo breviore, 1-3 glaberrimis, 4to modice pubescente. Thorax brevis, cordatus, postice maxime angustatus, basi brevissime tubulatim pedunculatus; elytra apice truncata. Pedes tenues elongati, tibiæ calcaribus obsoletis, ungues simplicissimi, tarsi postici articulis duobus primis elongatis.

This genus is evidently related to Lionychus, but differs in not having the anterior margin of the clypeus elevated, and in having the head strongly constricted posteriorly. The mentum-tooth of Lionychus is said to be distinct; in this genus, the middle portion of the basal membrane, filling the emargination, is corneous, but less so than the mentum itself, so that in certain positions the mentum appears to have a large obtuse tooth, united by a suture, and in other positions to be without a tooth. But one species is known to me.

D. f l a v i p e s, piceo-niger, nitidus, thorace latitudine sesqui breviore, postice valde angustato, antice latissimo et lateribus subangulato, margine reflexo picescente, elytris duplo latioribus, obsolete striatis, pedibus flavo-testaceis. Long. ·17.

Louisiana, Mr. Guex. The antennæ are entirely black, the palpi piceous, the ligula and adjoining parts pale.

NEMOTARSUS *Lec.*

Caput pone oculos rotundatum et valde constrictum, collo tenui cylindrico; labrum quadratum, os angustum: palpi maxillares labialibus duplo longiores, articulo ultimo præcedente duplo longiore, conico, acuminato, labiales articulo ultimo leviter ovali, acuto: mentum dente magno indistincto; antennæ filiformes, articulis æqualibus, 2^{ndo} sesqui breviore. Thorax semicircularis, basi truncatus; elytra truncata. Pedes tenues, elongati, tibiæ calcaribus elongatis, ungues fortiter pectinati, tarsi filiformes, postici articulis 1-4 gradatim brevioribus.

In form, this little insect exactly resembles Plochionus, but the head is more suddenly constricted behind: the strong spurs of the tibiæ approximate it more nearly to Tetragonoderus: the ligula is precisely as in Lebia, that is, with the paraglossæ entirely connate: the mentum as in Lebia, with a large indistinct tooth. The only species known to me is:—

N. elegans, flavo-testaceus, elytris profunde striatis, interstitiis convexis, atris margine tenui laterali, apice late, maculaque utrinque magna antica usque ad medium extensa flavis. Long. ·18.

One specimen from Illinois, Mr. Willcox; a second found by me in Upper Georgia: the elytra are marked very much as in Lebia axillaris *Dej.*; the anterior spot extends from the middle nearly to the base; its outer margin is parallel with the side of the elytron; its inner margin is rounded.

The second division of this group consists of insects which live in the ground under stones and leaves, but occasionally are found under bark of dead trees: one genus alone (Coptodera,) is said to occur on plants.

These insects differ from the preceding genera, in having the head but slightly constricted behind the eyes, and by no means furnished with a distinct neck: the mentum has a membrane filling up the emargination, so that the tooth is more or less indistinct: the palpi are flattened at tip, or acuminate, so that in one direction their apex appears sharp. Owing to the indistinctness of the characters derived from the mouth, and the variable form of the ungues of the tarsi in closely allied species, the genera of this group are in a moderate state of confusion. In all of our genera, the tarsi are entirely filiform: the ligula is variable in form, some of the genera having connate paraglossæ, others having them free at the apex.

Palpi labiales cylindrici.	
Tibiæ intermediæ spinulosæ, thorax basi truncatus - -	Tetragonoderus *Dej.*
Tibiæ intermediæ non spinulosæ, thorax basi truncatus.	
Mentum dentatum, ungues pectinati - - -	Coptodera *Dej.*
Mentum non dentatum, ungues pectinati - -	Dromius *Bon.*
Mentum vix dentatum, ungues simplicissimi - -	Apristus *Chaud.*
Thorax basi lobatus, ungues subserrati - - - -	Metabletus *Schmidt.*
Palpi labiales crassi, ungues plus minusve serrati - -	Axinopalpus *Lec.*

Coptodera and Dromius come very near together, so much so that I have been unable to find any distinct character to separate them: besides the slight and uncertain character in the mentum, the palpi of Dromius appear to be thicker, and the spurs of the tibiæ less developed.

Tetragonoderus contains two native species: T. intersectus *Lec.* (*Lecontei* Dej.: *Bembidium intersectum* Germ. Ins. Nov. 28,) and T. fasciatus Lec.; (*Coptodera fasc.* Hald. Proc. Acad. Nat. Sc. 1, 298: *Thyreopterus fasc.* Lec. Ann. Lyc. 4, 197.)

The differences between the American species of Axinopalpus, Apristus, and Metable-

tus* have been already pointed out by me. My genus Bomius must be united with Metabletus, the ungues being either simple or slightly serrate; the genus Blechrus *Motsch.* which I considered as perhaps identical with Bomius, is not adopted by Chaudoir, on account of the falseness of the characters given: Chaudoir says that the typical species has dentate ungues, and must therefore be placed in Metabletus: it is probable that the form of the ungues is not to be considered as of generic value, as we have differences in species that are certainly closely allied. The same variations are to be found in Axinopalpus.

The third division of the group consists of species of a larger size, living under stones or under bark, and distinguished by the mentum tooth being large and distinct, not obscured by a basal membrane: the paraglossæ are always connate with the ligula: the labial palpi are more or less dilated and truncate; the maxillary palpi are always cylindrical, and truncate, never acuminate: the fourth joint of the tarsi is triangular and more or less emarginate. Our genera are the following:—

A. Ungues dentati.	
Thorax basi lobatus; palpi labiales crassi - - - - -	Apenes *Lec.*
Thorax basi truncatus; palpi labiales crassi - - - -	Glycia *Chaud.*
Thorax basi truncatus, palpi labiales mediocres: tarsi art. 4to bilobo -	Calleida *Dej.*
Thorax basi truncatus, palpi labiales mediocres: tarsi art. 4to triangulari	Cymindis *Latr.*
B. Ungues non dentati: thorax basi truncatus - - - -	Philotecnus *Lec.*

The characters of these genera have been sufficiently detailed by me in the fifth volume of the Annals of the Lyceum. It is merely necessary to state at present that to Glycia belong Cymindis purpurea *Say.* Trans. Am. Phil. Soc. 2, 9, and C. viridicollis *Lec.* Ann. Lyc. 4, 188. C. amœna *Lec.* is only a green variety of C. purpurea.

Philotecnus ruficollis *Lec.* Ann. Lyc. 5, 175, is evidently Calleida croceicollis *Mènét.* Bull. Soc. Petrop. 2, 53. The last-mentioned specific name has, of course, priority.

h. *Trechi.*

A group composed of small species, easily distinguished from all other Carabica, by the 8th stria of the elytra being broadly interrupted or obsolete: the sutural stria is frequently recurved at the apex. The last joint of the palpi is acuminate, and in some species is smaller than the penultimate, and subulate: this form of palpi, as we will afterwards find, occurs again in the Bembidia, which are distinguished from Trechi, not only by the deep and entire 8th stria, but by the diagonal suture of the epimera of the mesothorax.

The ligula is free at the apex and truncate: the males have two joints of the anterior tarsi obliquely dilated, and papillose beneath, but in Anophthalmus scarcely any dilatation can be perceived. The anterior tibia are variable in form, being linear and emarginate below the middle in Anophthalmus, while in Epaphius and Tachys they are somewhat dilated and emarginate as far as the middle. These insects have the basal joints of the antennæ sometimes hairy, and thus approach the Harpali in Stenolophus and still more nearly in Eucærus.

* Ann. Lyc. 5, 177.

i. *Platyni.*

In this group the anterior tibiæ are linear, or very slightly dilated, and scarcely spinous at tip: the first three joints of the antennæ are entirely glabrous: the ligula is free at the extremity, and the paraglossæ distinct. The elytra are sinuate, or rounded at the tip, never truncate: the ungues are either pectinate, obsoletely serrate, or simple: the anterior tarsi of the males have three joints slightly dilated, and papillose beneath. Except by sexual characters, it is difficult to separate this group from Pterostichi and Chlœnii: the body is, however, never densely pubescent as in the latter. This group also evidently osculates with Patrobus, among the Bembidia, the epimeral suture in some species being somewhat oblique.

Of the genera contained in it, I will merely observe that they seem to have been unnecessarily multiplied on very slight characters, and yet without a careful comparison of foreign species, it is impossible to reduce them to order. I am inclined to believe that the form of the ungues has received more weight than it deserves, as in comparing three species of Pristodactyla, I find that while one has the ungues strongly pectinate, and another has them almost smooth, the third is exactly intermediate, having them slightly but distinctly toothed. Sericoda *Kirby* (Rhytiderus *Chaud.*) belongs in this group, but there appears to be no reason for separating it from Platynus. The species of the last named genus are so numerous and closely allied that it would be useless to describe the new species, except in a synopsis.

k. *Pterostichi.*

These are insects with the anterior tibiæ somewhat thickened towards the tip, and armed with short spines: the antennæ have three joints entirely glabrous: the tarsi are cylindrical; the anterior ones of the male have three joints dilated, triangular or obcordate, with a double series of papillæ beneath. The European genus Broscus, usually associated with these, must be removed to the neighbourhood of Scarites, on account of the form of the epimera of the mesothorax, and the different brush-like dilatation of the anterior tarsi of the male.

Of the genera allied to Pterostichus, I have given a synopsis in the Journ. Acad. Nat. Sci. (New Ser. 2, 225.) All the other native species must be merged into Amara, with the exception of two species belonging to the genus Myas, which is sufficiently distinct by the dilated form of the palpi.

The mentum in all the genera known to me is strongly toothed; this character, added to the flat labrum, enables this group to be distinguished from the Licini. The systematic separation from Chœlnii, however, appears to be purely sexual. The pubescence of the upper surface enables the latter to be distinguished at first sight.

Our genera of the present group are then: Evarthrus *Lec.;* Pterostichus *Bon.;* Lophoglossus *Lec.;* Holciophorus *Lec.;* Loxandrus *Lec.;* Pœcilus *Bon.;* Myas *Dej.;* Amara *Bon.*

l. *Harpali.*

This group contains a large number of genera closely related to each other, and scarcely to be distinguished except by sexual characters, which are here very variable. They may

be distinguished from Pterostichi by the third joint of the antennæ being rough and pubescent, at least at its apex. The anterior tibiæ are more or less incrassated at tip, and usually slightly spinous: the thorax is truncate posteriorly, never pedunculated: the elytra are rounded, at tip or sinuate, and rarely truncate: the marginal stria is always normal in its position. When the anterior tarsi of the males are dilated, the intermediate tarsi usually show a similar structure.

It is probable that in this group, as in the Platyni, the judicious study of more extensive material than is afforded by one country will greatly diminish the number of genera. The most important generic character seems to be found in the form of the ligula, which is free at the apex, sometimes dilated, sometimes narrow: the paraglossæ are distinct, sometimes narrow, sometimes broad. Our genera may be divided into three groups.

a. Tarsi maris anteriores non dilatati, (pedibus subfossoriis.)
b. Tarsi maris anteriores dilatati, subtus spongiosi.
c. Tarsi maris anteriores præcipue dilatati, subtus biseriatim papillosi.

The first division contains Daptus and allied genera: the head is usually larger behind the eyes, than in the other two divisions; the anterior tibiæ are more dilated and more spinous, and the third joint of the antennæ is less pubescent. Besides these indications, I can give no characters which will enable the genera placed here to be distinguished from those which follow. The table of relations is:

Tibiæ anticæ extus subdentatæ - - - -	Nothopus *Lec.*
Tibiæ omnes apice expansæ - - - - -	Geopinus *Lec.*
Tibiæ simplices, mentum dentatum - - - -	Cratacanthus *Dej.*
Tibiæ simplices, mentum non dentatum.	
Labrum emarginatum, tarsi postici articulis 4 æqualibus	Cratognathus *Dej.*
Labrum non emarginatum, tarsi postici articulis 4 æqualibus	Agonoderus *Dej.*
Labrum non emarginatum, tarsi postici art. 4 gradatim brevioribus	Discoderus *Zim.*

Nothopus was formerly described by me (Ann. Lyc. 4, 151) as Euryderus, which name is preoccupied by Laporte's Eurydera. Geopinus contains only *Daptus incrassatus* Dej. My former genus Piosoma (Ann. Lyc. 4, 374.) seems so closely allied to Cratogmathus, that I have merged them together. Besides C. s e t o s u s (the type of my genus) I have another species from New Mexico, which, by the absence of setigerous punctures, resembles the South American species. I have named it:

C. c o r d a t u s, piceus, thorace subcordato, postice angustato, et lateribus sinuato, angulis posticis rectis, basi utrinque breviter impresso, elytris striatis interstitiis planis, 5to, 7mo que postice punctis paucis impressis, antennis pedibusque ferrugineis. Long. ·3.

Of Agonoderus, I have to observe, that A. suturalis *Lec.* (Ann. Lyc. 4, 373) is a distorted specimen of A. i n f u s c a t u s *Dej.*

Discoderus *Zim.*

This genus was proposed to me by my friend Dr. Zimmermann, and contains two species; Selenophorus parallelus *Hald.* (Proc. Acad. Vat. Sc. 1, 302) and S. tenebrosus *Lec.*

(Ann. Lyc. 4, 391.) The anterior tarsi of the males are not dilated: the intermediate tibiæ of that sex are bent inwards, and strongly serrate internally. Besides these sexual characters, there is nothing to distinguish this genus from Selenophorus, except the greater breadth of the anterior tibiæ: the ligula as in Selenophorus is narrow, the paraglossæ broad and rounded: the 2d, 5th and 7th striæ of the elytra are marked with distant punctures: the two species are very closely related, and may be distinguished as follows:

1. D. parallelus, elongato-ovalis, cyaneo-niger, thorace latitudine subbreviore, lateribus rotundatis, angulis omnibus rotundatis, posticis leviter explanatis, elytris profunde striatis, triseriatim punctatis, antennis rufis, tibiis tarsisque rufo-piceis. Long. ·29.

Georgia, Pennsylvania, Missouri Territory.

2. D. tenebrosus, subelongatus, ovalis, subconvexus, niger, thorace latitudine breviore, lateribus magis rotundatis, angulis omnibus rotundatis, posticis obsolete explanatis, elytris profunde striatis, antennis rufis, tibiis tarsisque posticis rufo-piceis. Long. ·26.

Missouri Territory, near the Rocky Mountains.

The second division is named Eurytrichini in my catalogue of Geodephagous Coleoptera. It consists of genera in which four joints of the anterior and middle tarsi of the male are strongly dilated, and furnished beneath with a dense brush of hairs, as in Chlœnius; the fourth joint is strongly emarginate, or bilobed. Except by this sexual character, this division cannot be recognised, although the form of the ligula and paraglossæ will be sufficient to separate the genera from those of the next division. The terminal spur of the anterior tibiæ is subject to great variation in form in the genus Anisodactylus; it is double in the European genus Diachromus, but single in all the rest. Dichirus *Man.* was described as having a double spur, but after a very close examination, I can find no sufficient reason for separating it from Anisodactylus, the original observations on the form of the spur being erroneous.

Our genera may be thus arranged.

Ligula apice dilatata, paraglossis angustis longioribus; mentum edentatum	Anisodactylus *Dej.*
Ligula apice non dilatata, truncata, vel subtruncata:	
Paraglossæ angustæ curvatæ, ligulæ æquales:	
Mentum medio edentatum - - - -	Xestonotus *Lec.*
Mentum medio dentatum - - - -	Spongopus *Lec.*
Paraglossæ latæ, rotundatæ, ligula longiores:	
Mentum medio edentatum - - . -	Amphasia *Newm.*
Mentum medio dentatum - - - -	Eurytrichus *Lec.*

With Anisodactylus, as above mentioned, I have found it necessary to unite Dichirus *Man.* which has the spur of the anterior tibiæ, not double, but only trifid, as in many of our common species; (A, merula, nigrita, luctuosus, &c.)

I have found it necessary to place in the same genus Harpalus femoratus *Dej.* I formerly considered it as belonging to to Amphasia, but the ligula is as in the other species

of Anisodactylus, although the paraglossæ are not so much elongated. Our numerous species may be grouped as follows.

a. Corpus pubescens, elytris interstitiis biseriatim punctatis: tibiæ anticæ calcare terminali utrinque acute dentato. (A. dilatatus, brunneus, parallelus, obtusus, cum speciebus aliis sub Dichiro inscriptis.)

b. Corpus glabrum, ellipticum vel oblongum, tibiis anticis calcare terminali utrinque acute dentato. (A. merula, carbonarius, &c.)

c. Corpus glabrum, tibiis anticis calcare terminali basi latiore, non dentato. (A. nigerrimus, nigrita, californicus, cænus, &c.)

d. Corpus pubescens, tibiis anticis calcare terminali simplici. (A. femoratus.)

The first group recedes from the others in the intermediate tarsi of the male being sometimes scarcely dilated: the 2d and 3d joints of the anterior tarsi are strongly transverse, and the 4th not deeply bilobed; there are, however, some species of group (c) in which the middle tarsi are much less dilated than the anterior pair, while the species of group (b) have the 2d and 3d joints of the anterior tarsi as strongly transverse as those of Dichirus. We would not, therefore, be justified in considering the latter as a distinct genus.

Spongopus still contains only the typical species S. v e r t i c a l i s *Lec.* (Ann. Lyc. 4, 378,) it seems closely allied to Diachromus *Er.*, but differs in having only a single long and slender spur at the end of the anterior tibiæ.

Xestonotus *Lec.*

This genus is established upon Selenophorus lugubris *Dej.*, which, from the form of the anterior tarsi of the male, I formerly placed in Anisodactylus: the ligula however differs essentially from that genus; it is truncate at tip, and not dilated, furnished with two long bristles: the paraglossæ are slender and curved, not extending beyond the ligula: the emargination of the chin is rounded. The anterior and middle tarsi of the male have the first joint slightly dilated, the two next broader and transverse, the fourth broad and deeply bilobed: the spur of the anterior tibiæ is simple, and moderately slender. The diagnosis of the species will be:

X. l u g u b r i s, oblongus, niger, opacus, capite maiusculo, thorace latitudine sesqui breviore antice valde emarginato, angulis posticis obtusis, ad basin utrinque late leviter impresso, et obsolete punctulato, elytris interstitiis vix convexis, 3^{io} postice unipunctato, antennarum articulo 1mo palporumque apice rufis. Long. ·4.

Eurytrichus *Lec.*

This genus has been described at length by me in the 4th volume of the Annals of the Lyceum: it contains Feronia t e r m i n a l i s *Say*, (of which Harpalus testaceus *Hald.* Proc. Ac. Nat.Sc. 1, 302, is a variety;) Harp. a g i l i s *Dej.*; E. p i c e u s *Lec.*; E. n i t i d i p e n n i s *Lec.*,* and a large species from Louisiana, sent by Messrs. Wapler and Sallé, under the name Harp. dulcicollis *Ferté* (Rev. Zool. 1841,) with the description of which it by no means

* H. dichrous Dej. and H. vulpeculus *Say*, do not belong to Eurytrichus, as I formerly supposed, but to Bradycellus.

agrees. I am inclined to believe that it may be Harp. maculicornis *Chaud.* (Bull. Mosc, 1843:) it is nearly of the size of H. bicolor, and may be distinguished as follows:

E. maculicornis, oblongus, niger nitidus, thorace latitudine sesqui breviore, antrorsum subangustato, lateribus modice rotundatis, postice late subdepressis, angulis posticis obtusis, basi utrinque leviter impresso, elytris striatis, interstitiis vix convexis, 3^io^ postice unipunctato, palpis antennisque rufis, his articulis 2-6 plus minusve nigricantibus. Long. ·58.

It is quite possible that future investigation may show the necessity of uniting Eurytrichus with Anisotarsus *Chaud.* (Bull. Mosc. 1837,) but as we already have two genera, Spongopus and Eurytrichus, differing from Anisodactylus by having a mentum-tooth, it will be necessary to know the form of the ligula of the typical species, A. brevicollis, before we can unite either of the genera with Anisotarsus.

In the third division of the Harpali the dilated joints of the tarsi of the male are not brush-like, but are furnished beneath with two series of feathery papillæ; in some of the species the first joint of the anterior tarsi of the female is large and dilated: it is doubtful if so much stress should be laid upon this character as has been done in the case of the Texan genus Gynandrotarsus *Ferté*, the male of which, according to the author, is a genuine Harpalus.

Some of the species of Stenolophus have the male tarsi scarcely dilated, thereby approaching the genera of the first division of the group, but they are easily distinguished by their more slender legs, and narrower anterior tibiæ.

The form of the ligula appears to be of fundamental importance in separating our closely allied genera.

A. Ligula angusta, fere linearis, paraglossis planis paulo longioribus.
- Mentum edentatum, tarsi antici articulo 1^mo^ longiore - Gynandropus *Dej.*
- Mentum edentatum, tarsi antici articulis 1-4 æqualibus - Selenophorus *Dej.*

B. Ligula apice truncata, libera, paraglossis æqualis.
- Ligula apice dilatata, paraglossis planis, mentum edentatum Pangus.
- Ligula vix dilatata, paraglossis inflatis, mentum plus minusve dentatum Harpalus *Latr.*

C. Ligula apice truncata, libera, paraglossis brevior.
- Mentum valde dentatum, labrum truncatum - - - Bradycellus *Er.*
- Mentum non dentatum:
 - Antennæ filiformes; elytra apice rotundata - - Stenolophus *Dej.*
 - Antennæ moniliatæ, extus incrassatæ - - - Trechicus *Zim.*
 - Antennæ filiformes; elytra apice truncata - - Eucærus *Lec.*

Gyandrotarsus does not appear in the tables, as I have never seen the insect, and the description by Ferté (Ann. Ent. Soc. Fr. x. 201,) ignores the ligula altogether: the mentum is said to be longer than usual, concave, squarely emarginate, and without a tooth. In his figure the ligula is represented as dilated with narrow paraglossæ, and the spur of the anterior tibiæ as lobed. As far as can be ascertained by comparing the descriptions, G. harpaloides is identical with Harpalus similis *Say*, (Trans. Am. Phil. Soc. 2, 29.) Say's species was found abundantly in North Carolina; Ferté's came from Texas.

Pangus seems distinct both from Selenophorus and Harpalus, by the form of the ligula and paraglossæ: the former is broad, dilated and truncate at the extremity; the paraglossæ are broad, rounded and flat, not extending beyond the ligula; the mentum is not at all toothed in P. caliginosus and P. testaceus, and very obsoletely toothed in Harpalus fraternus Lec. (Ann. Lyc. 5, 185,) which must be placed in this genus. I cannot find any description of this genus in the books; it was proposed in manuscript by Ziegler, many years ago, but as he apparently had no rational motive for founding it, or at least expressed none in any tangible form, systematic authors seem to have abandoned it as untenable: for this reason I have placed no authority after the genus in the synoptic table. The diagnosis of the new species is:

P. testaceus, elongato-oblongus, rufo-testaceus, nitidus, thorace latitudine plus sesqui breviore, lateribus anguste fortiter depressis, subpunctatis, antice rotundatis, angulis posticis rectis, prominulis, ad basin utrinque breviter impresso, elytris apice vix sinuatis, striis obsolete punctatis, interstitiis subconvexis, 3io unipunctato. Long. ·45.

Two specimens, Illinois; Mr. Willcox: one of the specimens has no puncture on the third elytral space. The sharp posterior angles of the thorax will distinguish this from any American species of Harpalus.

Bradycellus *Er.*

This genus contains many closely allied species, some of which so closely resemble in appearance species of the next genus, that in every instance it is necessary to examine the mentum before deciding on the genus to which any particular species belongs: I have tried without success to find some empirical character to remove this difficulty.

Although recognising the difference between this genus and Stenolophus, I was led, in my Catalogue of Geodephagous Coleoptera, to consider it as Geobænus *Dej.*, which, however, as there remarked, appears, by its brush-like dilated tarsi, to belong to the preceding division of the group. The excellent work of Erichson* afterwards made known to me the real differences of the genera of this group. In this genus must be placed Harp. dichrous *Dej.* (*iricolor* Say;) H. vulpeculus *Say* (*nigripennis* Dej.) and H. obesulus *Lec.* (Ann. Lyc. 5, 185:) the first of these, from its general appearance, was formerly considered by me as a Eurytrichus, but the examination of a male specimen since obtained, and the careful study of the ligula, has shown its relation to the other species of this genus.

Stenolophus badiipennis *Hald.* (Proc. Ac. Nat. Sc. 1, 202) also belongs in this genus: in my Catalogue of Geod. Col. it is falsely placed as synonymous with Trechus ruficrus *Kirby*, (Faun. Bor. Ann. 47,) which is unknown to me.

Acupalpus suturalis *Lec.* (Ann. Lyc. 4, 411,) also belongs here, but the name being preoccupied by a European species, it must be called B. nebulosus. My eleventh species of Geobænus, (G. neglectus,) having no mentum tooth, belongs to Stenolophus.

Stenolophus *Dej.*

Of this genus there are in my collection about twenty-nine species: several of these are

* Käfer der Mark Brandenburg.

yet undescribed, but as isolated descriptions would tend only still more to confuse this difficult genus, they must be made known at some future time in the form of a synopsis. Our species form four groups:

1. The first contains those species which have the posterior angles of the thorax rounded, and the anterior and middle tarsi of the male broadly dilated, the fourth joint being deeply bilobed: the described species are, carbonarius *Brullé*, (*Harpalus carb.* Dej.;) spretus *Dej.;* fuliginosus *Dej.* (*versicolor* Kirby, and *fuscipennis* Lec.;) plebeius *Dej.;* fuscatus *Dej.* and coniunctus *Lec.* (*Trechus coniunctus* Say, *Acupalpus misellus* Dej.; *Ac. rotundicollis* et *lugubris* Hald.)

2. In this group the posterior angles of the thorax are rectangular and prominent; the tarsi of the male as in the first group; the alternate spaces of the elytra are marked with indistinct series of punctures: only one species belongs here, S. alternans *Lec.* (*Badister testaceus* Lec. Proc. Acad. Nat. Sc. 2, 252, *Aepus testaceus* ejusd. Ann. Lyc. 4, 413.) The name *testaceus*, being pre-occupied by Dejean's Acupalpus testaceus entering this genus, must be changed.

3. This contains several species like S. ochropezus *Say* (of which S. convexicollis *Lec.* is a variety) in which the posterior angles of the thorax are rounded and the middle tarsi of the males scarcely dilated: here belong S. dissimilis and unicolor *Dej.*

4. The fourth group consists of very small species, having the male tarsi imperfectly, or not at all dilated: the form of the thorax is variable, although the posterior angles are never very prominent. Here belong all the species of Acupalpus, mentioned in the fourth volume of the Annals of the Lyceum, except A. suturalis, which, as above stated, is a Bradycellus. A. micros *Lec.* is not sufficiently distinct from A. testaceus *Dej.*

Trechicus *Zim.*

This genus is proposed to me by my friend Zimmerman, on two small insects from the Southern States, which have very much the appearance of minute Trechus, both by the form of the body and by the elongate acuminate palpi: the males have four joints of the anterior tarsi slightly dilated: the marginal stria of the elytra is entire, not interrupted as in Trechus: the labrum is square and flat, the mentum not toothed; the antennæ are as long as the head and thorax; the 2d and 3d joints equal; the following ones broader and thicker, somewhat moniliate, gradually very slightly increasing in size; the thorax is subtrapezoidal, narrowed behind, with obtuse angles; the elytra are broadly rounded at tip, scarcely striate; the 3d interstice with three impressed punctures; the 8th stria entire, and reaching almost to the suture. The species were first sent me by Zimmerman, under the names that I have adopted.

1. T. umbripennis, testaceus, nitidus, capite nigricante, ore palpis antennisque rufo-testaceis, elytris obsoletissime striatis, cyaneo-micantibus, thorace vix sesqui latioribus, disco et apice infuscatis. Long. ·11. Georgia and Carolina.

2. T. pallipennis, piceo-testaceus, nitidus, capite thoraceque nigris, elytris thorace plus sesqui latioribus, pallidis, striis vix distinctis, sutura apiceque late subinfuscatis, pedibus, palpis, antennisque pallidis. Long. ·09. Carolina.

Eucærus *Lec.*

A singular genus which illustrates still farther the affinity towards Trechus, and slightly towards the Lachnophori. The form is altogether that of Trechus, except that the elytra

are broadly truncate behind: the 8th stria is entire, and the 9th continues around the extremity, almost to the sutural stria, as in Lachnophori. The paraglossæ are longer than the ligula, and pointed at their extremity: the mentum is not toothed: the palpi are acuminate at tip: the last joint of the maxillary palpi is scarcely longer than the preceding. The antennæ are filiform, with only the first joint shining: the joints are equal in length excepting the 2d, which is one half shorter. The thorax is rounded, slightly cordate, being narrowed behind, with a short broad lobe at the middle of the base. The feet are slender, the terminal spurs distinct, the posterior tarsi long. Mazoreus is probably allied to this genus, but I have had no opportunity of examining it, and can only judge by description.

E. varicornis, rufo-piceus, nitidus, capite obscuriore, thorace postice angustato, angulis posticis obtusissimis, elytris subtiliter striatis, interstitiis subconvexis, pedibus palpisque flavis, antennis testaceis, articulis 5 ultimis albis. Long. ·15.

One specimen, New Orleans, Mr. Guex. The margin of the thorax is wider towards the posterior angles and reflexed: the disc is slightly convex, the longitudinal line entire, and the transverse impressions distinct: the elytra are iridescent, about twice as wide as the thorax, and one third longer than wide: they have no scutellar stria: the third interstice is bipunctate.

m. *Licini.*

This group approaches the Harpali, but independent of sexual characters, is at once to be distinguished by the glabrous 3d joint of the antennæ. From Pterostichi its separation would appear more difficult; but the impressed labrum and edentate mentum do not occur in that group.

The first two or three joints of the anterior tarsi of the male are broadly dilated with rounded angles, and covered beneath with a dense brush of hairs. The 8th stria of the elytra and its punctures are in the normal position.

The only genera found in the United States are Badister, Diplochila, and Dicælus, all of which have three joints of the male tarsi dilated: some of the species of the first genus have the 3d joint of the antennæ hairy, but not rough as in the Harpali.

To the three species of Badister noted in the fourth volume of the Annals of the Lyceum must be added the two following:

1. B. maculatus, niger, thorace subtransverso, postice angustato, et profundius transversim impresso, angulis posticis rotundatis, elytris striatis, interstitiis fere planis, macula magna humerali, fascia tenui interrupta pone medium, pedibusque flavo-testaceis. Long. ·24.

A single specimen of this pretty species, found at Lancaster, Pa., was given me by Mr. S. S. Rathvon. The sides of the thorax are slightly reflexed towards the posterior angles; the basal impressions are small, the posterior transverse one deep. The humeral spot of the elytra is subquadrate, so the anterior third of their disc appears yellow, the suture alone remaining black: the posterior band is narrow, and consists of a common transverse spot, and a smaller one each side near the lateral margin: the epipleuræ are dull yellow: the feet are bright yellow, and the palpi testaceous; the antennæ are fuscous, with the first joint testaceous.

2. B. flavipes, niger, thorace subovali, postice subangustato et utrinque foveato, angulis posticis valde rotundatis, elytris micantibus, profunde striatis, bipunctatis, interstitiis convexis, antennis fuscis, pedibus flavo-testaceis. Long. ·25.

Two specimens from Louisiana, given me by my friend Dr. Schaum. This species in general appearance resembles B. micans *Lec.*, but the form of the thorax is very different. The thorax is not wider than long, oval scarcely trapezoidal, emarginate in front, rounded on the sides, which are scarcely reflexed, even at the posterior angles, which are much more rounded than in B. micans: the longitudinal line is deep, and abbreviated at the apex: the transverse impressions are faint, the basal impressions are deep and small. The lustre of the elytra is blue mixed with brassy, while in B. micans it is entirely blue and green, without any metallic appearance: the striæ are much deeper, and the interstices more convex: the palpi are dark testaceous.

Diplochila *Brullé*, (Rembus‖*Latr.*)

In this genus I have carefully reexamined the species described by me in the Catalogue above cited, but without coming to any definite result: the variations in form and dimension of the thorax are certainly too great for a single species, and yet no invariable characters have thus far been found for their separation: whatever may be the eventual fate of the species, I may at least assert, that my Rembus major and laticollis are identical, and probably different from C. impressicollis Dej. by their larger and wider thorax. R. obtusus, from Missouri Territory, is entitled to rank as a species, on account of the posterior angles of the thorax being rounded at the apex.

Dicælus *Bon.*

This genus presents great difficulties, since many of the species seem variable in the form and sculpture of the thorax, while others appear unchangeable. The species have been unnecessarily multiplied on slight grounds, and with a large series of specimens, it can be seen that the number may be greatly reduced. For the present I will only indicate the following synonyms:

D. decoloratus *Lec.* (Ann. Lyc. 4, 423,) is probably a very large badly colored specimen of D. splendidus *Say.*

D. violaceus *Bon.*, cyaneus *Dej.*, confusus *Lec.*, and iricolor *Lec.* are varieties of D. purpuratus *Bon.*

D. chalybeus *Dej.* must also probably be united with that species, as its characters appear by no means definite.

D. quadratus *Lec.* (Ann. Lyc. 4, 422,) is D. Lecontei *Ferté* (Ann. Ent. Soc. Fr. 2, 9, 277:) the first name has priority by several years.

D. quadratus *Ferté* seems to be merely D. dilatatus *Say*, Dejean having prepared the way for that error by quoting Say's species as a synonym to his Dejeanii, which is a much larger species, found only in the Southern States.

The smaller black species are also in great confusion on account of the variable nature of the characters. D. obscurus *Lec.* and what I considered as D. ambiguus must be united

with D. simplex Dej.; D. opacus *Ferté*, I cannot identify clearly; specimens sent from France under that name to Mr. Guex, are nothing but D. elongatus of a larger size than usual, but I am inclined to think that the original of Ferté is a true species.

It is difficult to determine whether D. ambiguus *Ferté* (Rev. Tool. 1841, 48; and Ann. Ent. Soc. Fr. loc. cit.) belongs to D. simplex, or to D. reflexus *Lec.*: a new examination of the specimen is required, and should it be found to correspond with D. reflexus, that name must of course be suppressed.

D. ovalis *Lec.* seems distinct from D. furvus *Dej.*; its form is a little broader, the interstices of the elytra are all equal, and the 8th is more acutely elevated.

The two following species are so distinct as to be well worthy of description:

1. D. costatus, oblongus, crassus, niger, subopacus, thorace transverso, lateribus planiusculis, antice valde rotundatis, impressione transversa postica profunda, basalibus parvis, elytris interstitiis subconvexis, 7^mo^ valde elevato. Long. ·95—lat. ·38.

Texas: two specimens collected by Lt. Haldeman, and one sent me by Dr. Schaum. This species is related to D. Dejeanii and dilatatus, but the elevation of the whole of the 7th interstice of the elytra at once distinguishes it: the sides of the thorax are much more rounded in front, and the depressed lateral portions are more uniformly flat: the basal impressions are less defined. The elytra are more declivous, and from the greater elevation of the 7th interstice the sides become nearly perpendicular, and they therefore do not appear wider than the thorax.

2. D. crenatus, ovalis, niger, subnitidus, thorace non transverso, antrorsum angustato, lateribus subrotundatis, modice reflexis, elytris postice subattenuatis, striis fortiter punctatis, interstitiis convexis, 7^mo^ postice gradatim minus elevato. Long. ·64.

One specimen from Louisiana, given me by Dr. Schaum, whose name I have adopted. The form of this species and the sculpture of the thorax is very much that of D. alternans *Dej.*: the strongly punctured striæ of the elytra will at once separate it from all others.

n. *Chlœnii* (genuini.)

In characters, the insects of this group agree with those of the next, except that the 8th stria of the elytra and its series of punctures are at the normal distance from the margin. The characters to distinguish this group from Platyni and Pterostichi appear to be dependent on sexual structures: the usually dense pubescence of the upper surface, however, is an excellent empirical character, which enables them to be known at once.

The labrum is flat, the mentum toothed: the first three joints of the antennæ glabrous, the anterior tibiæ slender, or very slightly thickened, scarcely spinous at the tip: the males have three joints of the anterior tarsi strongly dilated, with rounded angles, and furnished beneath with a dense brush. The ligula appears to be always dilated and truncate at tip, with distinct paraglossæ: the palpi vary in form according to species, and even sex, so that genera based upon their structure, are by no means satisfactory.

Our genera are Atranus *Lec.*; Eurydactylus *Ferté*; Chlœnius *Bon.*, and Dinodes *Bon.*: the North American species of the last is unknown to me.

I have adopted the genus Eurydactylus, although its characters are scarcely different from those ascribed to Dinodes. To Ferté's typical species E. tomentosus (*Epomis toment.* Say,) must be added Chlœnius purpuricollis *Randall*, which I formerly placed in Dinodes.

The species of Chlœnius are very numerous, and many are so closely related that their characters could be developed only in a complete synopsis, which must be postponed for the present. For the sake of avoiding confusion, the following synonyms and corrections may be found useful:

C. apicalis ‖ *Lec.* (Ann. Lyc. 5, 179,) must be changed to C. posticus, as the name is preoccupied.

C. perviridis *Lec.* (Ann. Lyc. 4, 434) is only a slight variety of C. sericeus.

C. smaragdinus *Chaud.* (Bull. Mosc. 1843,) bears the same relation to C. prasinus.

C. cordicollis *Kirby* (Faun. Bor. Am. 122,) is not synonymous with C. chlorophanus *Dej.* as formerly stated by me.

C. atripennis *Lec.* (Ann. Lyc. 4, 436,) must be united with C. tricolor.

C. cobaltinus *Dej.* and C. congener *Lec.* are both synonyms of C. æstivus *Say.*

C. virens *Chaud.* (Bull. Mosc. 1843,) is evidently C. circumcinctus *Say.*

C. niger *Randall*, has recently been mentioned as C. exaratus *Lec.* by Ferté, (Ann. Ent. Soc. Fr. l. c. 249.)

C. emarginatus ‡ *Kirby*, is evidently C. impunctifrons *Say*, and not C. tricolor, as formerly stated by me, (Ann. Lyc. 4, 436.)

o. *Oodides.*

A little group, belonging evidently to the Chlœnius series, but remarkably distinguished from all the other groups having the epimera of the mesothorax not diagonally divided, by the close approximation of the series of ocellate punctures to the margin of the elytra, and the confluence of the 8th and 9th striæ. The ligula is free and dilated at tip: the mentum toothed in the middle: the labrum is always flat, the three basal joints of the antennæ glabrous, and the palpi filiform: the prosternum is produced a little posteriorly, in all the species known to me, and the mesosternum is concave: the dilatation of the tarsi of the male is variable in the different genera, but they are always brush-like beneath, as in the two preceding groups.

Ferté, in his revision of Patellimanes, already cited, seems to have entirely overlooked the remarkable sexual differences between the genera of this group, differences which are altogether anomalous in the division "Patellimanes." The genera are thus related:

Tarsi omnes subtus pilosi - - - - -	Lachnocrepis *Lec.*
Tarsi postici subtus glabri.	
Tarsi antici maris articulis 4 dilatatis; (corpus punctulatum)	Anatrichis *Lec.*
Tarsi antici maris articulis 3 dilatatis; (corpus supra læve.)	
Antennæ filiformes tenues - - -	Oodes *Bon.*
Antennæ crassiores compressæ - - -	Evolenes *Lec.*

LACHNOCREPIS *Lec.*

Corpus elongato-ellipticum, planum; mandibulæ acutæ, prominulæ; labrum subquadratum, antice leviter emarginatum; mentum medio fortiter dentatum; ligula apice dilatata, truncata; palpi tenues, longiusculi, articulo ultimo leviter ovali, non longiore; tarsi omnes minus tenues, subtus dense pubescentes, posteriores articulo 1mo elongato, 3^{io} et 4to inter se æqualibus, 2^{ndo} longitudine intermedio; tarsi antici maris articulis 4 modice dilatatis, quadratis, latitudine longioribus, 4to perparum angustiore: antennæ tenues, filiformes.

The body is longer and more parallel, than in even the narrow species of Oodes; it is moderately acute in front, and obtuse behind. The only species known to me is Oodes? parallelus *Say*, (Trans. Am. Phil. Soc. 4, 420,) which may be thus characterized.

L. parallela, elongato-elliptica, antice acuta, nigro-picea, vix convexa, thorace antrorsum valde angustato, lateribus rotundatis, subdiaphanis et late obsolete depressis, angulis posticis obtusis, basi subemarginata, elytris non latioribus, interstitiis planis, 3^{io} postice unipunctato, antennis palpis tibiis tarsisque piceo-testaceis. Long. ·42—lat. ·15.

One specimen, Louisiana, Dr. Schaum. The rounding of the sides of the thorax continues to the base, so that a distinct angle is formed between the thorax and elytra.

ANATRICHIS *Lec.*

Corpus ellipticum, punctulatum antice acutum; mandibulæ acutæ prominulæ; labrum parvum subquadratum; mentum medio fortiter dentatum; ligula apice dilatata, truncata; antennæ tenues filiformes; palpi tenues, longiusculi, articuli maxillarium ultimo fere duplo longiore; tarsi posteriores subtus non pubescentes, sed lateribus setosi; tarsi antici maris articulis 4 leviter dilatatis, oblongis, gradatim angustioribus, subtus spongiosis; tibiæ intermediæ maris intus oblique emarginatæ.

The type of this genus is Oodes minutus *Dej.* (Sp. Gen. 5, 677) the peculiar sexual characters of which indicate the propriety of separating it as a distinct genus: the anterior tarsi of the male have the first four points oblong and slightly dilated, growing successively narrower; the interior face of the middle tibiæ in the male presents an oblique emargination, similar to that of the anterior tibiæ, but less deep: the portion below the emargination is moderately dilated. Apart from these sexual characters, we have nothing to distinguish the genus, except the more elongate terminal point of the maxillary palpi, and the punctulate upper surface of the body.

My specimens of this insect were found in Louisiana; the female was given me by Dr. Schaum, and the male by Mr. Guex.

OODES *Bon.*

This genus differs from those above described in having the first three joints of the anterior tarsi strongly dilated, nearly equal in breadth, and much wider than the fourth joint: when the 7th stria of the elytra is entire, the dilated joints are oblong; when that stria is obliterated, the dilated joints are broader and transverse. Ferté mentions (Ann. Ent. Soc. Tr. 2d Ser. 9, 271,) an O. stenocephalus, which from his very short description may be my O. picipes; but if so, he omits the most important difference between it and O. amaroides, with which he compares it, viz., the absence of the 7th elytral stria.

Our species may be arranged as follows:

A. Elytra stria 7^mo^ integra: 1. O. Americanus *Dej.;* 2. O. amaroides *Dej.*

B. Elytra stria 7^mo^ obliterata; 3. O. picipes *Lec.* (Proc. Ac. Nat. Sc. 2, 52; Ann. Lyc. 4, 431;) 4. O. 14-striatus *Chaud.* (Bull. Mosc. 1843; Lec. Ann. Lyc. 4, 431;) 5. O. cupræus *Chaud.* (l. cit.; Lec. loc. cit. 432,) O. *leucodactylus* Ferté (Ann. Ent. Soc. Tr. 2d Ser. 9, 273;) 6. O. elegans *Lec.* (Ann. Lyc. 5, 180.)

EVOLENES *Lec.*

Corpus ellipticum, læve; antennæ breviusculæ, subcompressæ; palpi filiformes, articulo maxillarium ultimo plus sesqui longiore; mentum medio breviter dentatum; ligula apice dilatata, subrotundata; tibiæ anticæ latiores, spina anteapicali longissima; tibiæ intermediæ valde spinosæ; tarsi subtus non pubescentes; antici maris articulis 3 valde dilatatis, 1^mo^ triangulari, 2^ndo^ et 3^io^ transversis.

This genus differs from Oodes, principally by the less slender form of the antennæ; but the more dilated anterior tibiæ, and the longer and stronger spines of the middle tibiæ also prove the necessity of separating it: the dilated tarsi of the male are as in the second division of Oodes, but the 7th stria of the elytra is as distinct as the rest. Only two species are known to me: the second is Oodes exaratus *Dej.* Sp. Gen. 5, 678.

1. E. impressa, elliptica nigra nitidissima, thorace lateribus postice late depressis, et profunde oblique impressis, elytris subtiliter striato-punctatis, interstitiis planis, postpectore parce punctato, antennis basi vix piceis. Long. ·31.

A unique specimen found in Louisiana, given me by Dr. Schaum.

2. E. exarata, elongato-elliptica, rufo-picea, nitida, thorace lateribus postice obsolete deplanatis, basi utrinque vix obsolete impresso, elytris profunde crenato-striatis, interstitiis vix convexis, postpectore, abdominisque lateribus punctatis. Long. ·23.

Georgia and Alabama; the male was given me by Mr. Haldeman.

Subfam. 3. SCARITINI.

Abdomen of both sexes with six segments: epimera of the mesothorax diagonally divided.

p. *Pseudomorphi.*

But one species of this group is found in the Southern United States, Pseudomorphus excrucians *Kirby*, (*Drepanus Lecontei* Dej.) which I have never seen: judging from the descriptions and figures given by Westwood in the 19th vol. of the Linnean Transactions, of this and allied genera, it is impossible to mistake the relationship between these insects and Ozæna. The ligula and paraglossæ are not sufficiently described, nor is the form of the epimera given, but the peculiar structure of the lower surface of the head, and the insertion of the antennæ under the projecting sides of the front are very distinct in all the figures. Some of the genera appear to have the prosternum produced, which would be a good character for separating this from the next group.

p. *Ozæni.*

Although no species of this group has yet been found in our territory, a species was brought from Mexico, by Lieut. Haldeman, which will probably be found in Texas, on further exploration, having been caught but a few miles south of our boundary. As a means

of illustrating the preceding group, I have thought it useful to detail certain characters which seem to have been overlooked by those who have written upon this group.

A peculiar character, which I have observed in no other Carabide, and which appears also in the figures of the genera of the preceding group is, the insertion of the antennæ under the sides of the front, which are dilated in front of the eyes. The labrum is small and flat; the mandibles in the species below described small and sharp: the palpi cylindrical, with the last joint longer than the penultimate: the chin is deeply emarginate, the tooth of the middle is very small and scarcely distinct: the emargination is nearly filled with the basal membrane of the ligula, as in Lebia; the ligula is slightly dilated at tip: the paraglossæ are broad, rounded, as long as the ligula, and connate with it: the antennæ are filiform, the three or four basal joints sparsely, the others more densely pubescent; the second is so closely articulated with the third that the separation can scarcely be perceived. The head is narrowed behind the eyes; the diagonal suture of the epimera of the mesothorax is very distinct: the parapleuræ are narrow, their posterior appendage is distinct. The abdomen has six ventral segments as usual. The legs (of this species) are compressed and broad, the femora deeply excavated on the under surface; the anterior tibiæ have a very slight emargination internally, with the spurs nearly obsolete; the tarsi are slender, hairy, as long as the tibiæ, with the claws very long and slender.

As not only the differences in the form of the antennæ and legs, already pointed out by Klug in his description of Ozæna testudinea,* exist in this species, but the middle tooth of the mentum is very much smaller than in the typical Ozænæ, it is necessary to consider it as a distinct genus, under the name of Physea *Brullé*, of which Trachelizus *Sol.* is a synonym.

The characters already detailed will tend to show that the Ozænæ must be regarded as a distinct type in the Carabidæ, possessing very slight affinities towards the Brachini, but indirectly allied with the Helluones, through the group succeeding this, which seems composed of species having affinities with Helluo and Ozæna.

The interruption of the lateral margin of the elytra seems to have been first pointed out by Klug, and remarkably distinguishes this from all the other groups: the margin anterior to the tubercle is slightly dilated, but the ocellate punctures are not obvious, and there is no stria adjacent to them. The species which has furnished the material for these notes appears to be new, and may be thus defined.

P. hirta, rufo-ferruginea, nitida, capite thoraceque fere lævibus, hoc valde transverso, lateribus valde dilatatis, rotundatis, concavis subrugosis, angulis omnibus valde rotundatis, basi truncata, elytris breviter pubescentibus, subtiliter granulato-punctatis, granulisque majoribus raris seriatis notatis, epipleuris lævissimis flavis. Long. ·5.

q. *Psydri.*

I have formed this group from two small species which seem to have a tendency towards Morio, but which differ essentially from that genus by their diagonally divided epimera. Taking into consideration the glabrous joints of the antennæ, and the pubescent middle

* Jahrbuch, &c.

tibiæ, they seem to have more relation with the Brosci than with any other tribe, and may properly form the passage from the Ozænæ to that tribe. There are probably many foreign genera which have been considered as allied to Ozæna and Morio, which will enter this group, but as the descriptions never mention the suture of the epimera, and but rarely the form of the antennæ, it would be useless for me to attempt a work which every entomologist with a foreign collection can do for himself. The characters presented by our two species, Psydrus piceus *Lec.* 4, 153; and Haplochile pygmæa *Lec.* (Ann. Lec. 4, 208, *Morio pygmæus* Dej. 5, 512,) are these:—

The antennæ are somewhat granose, the first four or five points shining, the others slightly pubescent; the first joint not longer than the others; the third joint longer than the second or fourth; the head below the eyes is slightly sulcate; the mandibles are short and stout; the labrum transverse, flat; the mentum is deeply emarginate, not toothed; the posterior angles of the thorax are distinct, and the prosternum not prolonged; the abdomen moderately pedunculated; the parapleuræ with a distinct posterior appendage; the anterior tibiæ deeply emarginate, truncate at tip; the middle tibiæ pubescent externally; the ligula dilated at tip; the paraglossæ apparently connate with it, but long and slender.

r. *Metrii.*

This group contains only one genus and one species, so far as known to me: it is Metrius contractus, *Esch.*, the position of which has puzzled entomologists very much. Dejean places it after Notiophilus, with which it seems to have no relation whatever: Eschscholtz says simply that it is a new genus of "Carabidæ simplicipedes," without any indication of its affinities. The following characters will exhibit my reasons for considering it as allied with Broscus, from which it seems to differ only in having the prosternum produced, and the abdomen so large as to shorten the parapleuræ.

The antennæ are slightly thicker towards the extremity: the first four joints smooth, the other growing gradually pubescent, the first joint not longer than the second; the head below the eyes not at all sulcate; the mandibles short, the labrum transverse, flat; mentum deeply emarginate, toothed in the middle; thorax closely united with the trunk, prosternum produced so as to cover the mesosternum; anterior acetabula entire, parapleuræ short and broad, posterior appendage sufficiently distinct; anterior tibiæ tolerably deeply emarginate internally, slightly thickened at tip; anterior tarsi of the male with three joints dilated and spongy beneath, the first being much longer and wider than the following; middle tibiæ strongly pubescent, both externally and internally: posterior tibiæ pubescent internally. Elytra with the marginal furrow very narrow, and the ocellate punctures obsolete.

The ligula is dilated, the paraglossæ entirely connate with it, and indistinct. This group with Broscus seems to have a tendency towards Panagæus, of the first division of the preceding subfamily.

s. *Promecognathi.*

But a single species of this group is known to me. P. lævissimus *Chaudoir*,* (*Eripus*

* Note sur le groupe des Stomides. Bull. Mosc. 1846.

læviss. Dej.) How far some of the other genera of Chaudoir's "Stomites" correspond in characters with it, must be left for others to determine; it may be here remarked, that Chaudoir's group is evidently very artificial, and after a careful comparison of Stomis with Promecognathus, I find no reason why the former should be removed from the Pterostichi, with which Erichson associated it. The following are the characters seen in Promecognathus.

The anterior tibiæ are slightly dilated, and deeply emarginate: the middle tibiæ are pubescent: the prosternum is not produced posteriorly; the parapleuræ have no trace of a posterior appendage; the marginal stria and punctures of the elytra are very close to the margin; the mandibles are long and prominent; the labrum is short and bisinuate as in Scarites: the mentum is very transverse, not deeply emarginate, with the tooth large; the ligula appears broad; the paraglossæ narrow and short; the first four joints of the antennæ are shining, the first much larger than the others; the remaining joints are covered with pubescence longer and less dense than usual. The tarsi of the males are not dilated.

This group seems to be the passage from the Brosci to the Scaritides, having a slight tendency towards Cychrus.

t. *Scaritides* (genuini.)

This group is abundantly distinguished from all others by the fossorial palmated anterior tibiæ, and by the subgeniculate antennæ, which have the first joint very long.

The parapleuræ have the usual appendage very indistinct and sometimes wanting; the striæ of the elytra are usually obliterated; the marginal groove is entire, and usually granulated to such an extent, as to obscure the series of ocellate punctures, which are in their normal position, not approximated to the margin. In some genera of this group the maxillæ are rounded at the extremity, the ordinary hook being completely wanting; the head is broadly sulcate below the eyes, so that the antennæ can be folded backwards; the mentum is trilobed, the middle lobes being nearly as long as the lateral lobes; the ligula is broad and rounded in Pasimachus, concave and truncate in Scarites. The thorax is truncate behind, with distinct angles, as in Pasimachus, or pedunculate as in Scarites; the tarsi of the males are not dilated. The anterior tibiæ are always emarginate internally. The foreign genera appear to have been founded upon very slight characters, and might probably be diminished in number by careful comparison.

In my monograph of Pasimachus, (Ann. Lyc. 4, 141,) I have proposed two species, which a larger series of specimens has proved to be badly founded: they are P. *assimilis* and P. *rugosus*, which must be united with P. sublævis. Pasimachus Californicus *Chaud* (Bull. Mosc., 1850,) is most probably P. punctulatus *Hald*, which is known to me as far west as Utah. The following is new.

P. duplicatus, niger, nitidus, thorace postice subangustato, et utrinque impresso, lateribus rotundatis valde marginatis, angulis posticis parvis rectis, elytris postice subacuminatis, seriatim punctatis, seriebus perparia approximatis, versus marginem bicostatis. Long. 1·0—1·18.

Creek boundary, Missouri Territory, collected by Dr. Woodhouse. This species is very similar to P. obsoletus *Lec.*, but is larger; the thorax is less cordiform, the pos-

terior angles though prominent are smaller; the striæ in P. obsoletus are slight furrows, at the bottom of which are single rows of punctures, while in the present species, the striæ are merely rows of punctures which are alternately approximated: the posterior tibiæ appear to be nearly glabrous internally in both sexes.

u. *Clivinæ.*

The characters of this group are the same as those of the preceding, except that the first joint of the antennæ is not longer than the others; the marginal sulcus of the elytra is still entire, though not granulated; the marginal row of punctures is in the furrow, and therefore more approximate to the margin; the ligula is usually more or less acuminate, and the paraglossæ are distinct; the anterior tibiæ are palmated, but frequently not toothed on the outer margin; the internal emargination is always deep. The thorax is more or less pedunculated, with the posterior angles indistinct, or altogether wanting; the antennæ have two basal joints and part of the third glabrous; they are indistinctly geniculate, but the first joint is not longer than the second or third; the head is slightly sulcate below the eyes.

Most of our species may be found described in Putzeys' elaborate monograph of Clivinæ: some California species have been added by me in the Annals of the Lyceum, vol. 5, and some Lake Superior species, in Agassiz' work on that region: several yet remain to be described, but it would be more useful to make them known in the form of a synopsis at a future time, as they are closely related, and at times difficult to identify.

To the genera already known in our country, Clivina, Schizogenius, Dyschirius, Ardistomis, and Aspidoglossa, I have added a new one, Acephorus, found on the shores of the ocean, at San Diego, California. The following notes on previously described species must be borne in mind.

Schizogenius ferrugineus *Putzeys'* (1846) is Clivina sulcata *Lec.* (Ann. Lyc. 4, 214, 1846.) The first mentioned ought to take precedence, being in a more general work. S. simplex and pluripunctatis *Lec.* (Ann. Lyc. 5, 197) are varieties: the latter name being more applicable must be preserved.

Dyschirius apicalis *Lec.* (Agass. Lac. Sup. 204,) must be changed to D. nigripes, as the former name is preoccupied by Putzeys.

v. *Bembidia*, (genuina.)

A numerous group composed of small species, which in their form of body imitate almost all the other groups, but which by their structure are so intimately related that scarcely any generic differences can be found. Many of them have the last joint of the palpi small and subulate, being the only predaceous land Coleoptera having this form of palpi, with the exception of certain species belonging to the Trechi, from which they differ in having the 8th stria of the elytra entire and deep.

To various members of the preceding subfamily, especially to the Trechi, Platyni, and Pterostichi, they show a strong resemblance, but are distinguished by the episterna of the mesothorax being diagonally divided.

The antennæ have only two glabrous joints, the third being moderately pubescent; the

anterior tarsi of the male have two dilated joints, of which the first is the larger: in Pericompsus, this dilatation is wanting, the tarsi being alike in both sexes. The genus Pogonus belongs in this group; the only American species described, P. minutus *Dej.* has never come under my notice.

I am doubtful respecting the position of Patrobus, which seems to have very strong relations with Pterostichus, and ought probably to form a separate group in the preceding subfamily: the episterna are not as diagonally divided as in the other genera placed here, but their posterior part is slightly triangular in form.

Our genera may be thus arranged:

A. Palpi subulati.	
Oculi nulli - - - - - - -	Anillus *Duval.*
Oculi distincti, tibiæ anticæ oblique truncatæ:	
Antennæ articulo 3^io^ contiguis minore - -	Blemus.
Antennæ articulo 3^io^ contiguis æquali - -	Pericompsus *Lec.*
Oculi distincti, tibiæ anticæ apice recte truncatæ.	
Mentum dente medio plus minusve distincto, integro -	Ochthedromus *Lec.*
Mentum dente medio brevi, emarginato - -	Hydrium *Lec.*
Mentum trilobum, lobo medio non breviore - -	Bembidium *Latr.*
B. Palpi cylindrici - - - - - - -	Patrobus *Dej.*

Anillus was established by Jacquelin-Duval, (Ann. Ent. Soc. Fr. 1851, lxxiii.) upon a very small species found in the southern part of France: among my California insects I find three specimens of a nearly allied species, found under stones at San Jose: no sexual difference can be perceived. It may be thus defined:

A. debilis, apterus testaceus, vix parce pubescens, thorace latitudine non breviore, subcordato, postice valde impresso, angulis posticis minutis rectis, elytris vix obsolete striato-punctulatis, interstitiis subtilissime alutaceis. Long. ·05.

Pericompsus is described by me in the Annals of the Lyceum, Vol. 5: it contains Tachys ephippiatus *Say*, and two allied new species.

With Ochthedromus must be united Odontium *Lec.* (Ann. Lyc. 4, 452,) the characters not being sufficient for a well defined genus. The species of Ochthedromus, in which the front is sculptured with converging furrows, (O. angulifer, connivens, cautus, and frontalis *Lec.*) have the labrum smaller than in the other species, and emarginate, but there does not appear to be sufficient difference to enable them to be separated.

Bembidium will contain, then, only the species having impressed square spots on the elytra: in addition to the peculiar form of the mentum, the first joint of the anterior tarsi of the male is much larger than in the other genera.

Of Patrobus, there are known to me three native species: P. longicornis *Say*, (*Americanus* Dej.;) P. angicollis *Randall*, (Bost. Jour. Nat. Hist. 2, 1,) and P. tenuis *Lec.* (*Pterostichus tenuis* Lec. Agass. Lac. Sup. 207;) the type of the latter is a female, and except in the antennæ and episterna of the mesothorax, precisely resembles a Pterostichus.

Pogonus rectus *Say*, as already shown by me, (Journ. Acad. Nat. Sc. 2d ser., 2, 251,) is a species of Loxandrus, a genus of Pterostichi.

x. *Carabi*, (genuini.)

A group containing insects of varied form, usually of large size, and having in common nearly filiform anterior tibiæ, which are not emarginate internally, and which have the usual spurs both placed at the apex: the most remarkable character distinguishing them is the imperfection of the anterior acetabula, the posterior margin of which is membranous, so that the coxa comes in contact with the mesosternum. The prosternum is more or less produced behind; the mesosternum is declivious and carinate anteriorly, and concave posteriorly. The anterior tarsi of the males, when dilated, are spongy beneath: many of the species are remarkable for possessing a greater number of elytral striæ than is found in any of the preceding groups.

Our native genera are Cychrus (including Scaphinotus and Sphæroderus,) Carabus, Callisthenes, Calosoma, Nebria, Notiophilus and Opisthius, besides a new genus allied to Cychrus, below described.*

Of Cychrus, there are in my collection eighteen species, which may be thus classified:

A. Thorax plus minusve cordatus, (tarsi maris parum dilatati.)

a. Thorax valde marginatus.

1. Margine thoracis laterali postice valde dilatato: C. unicolor *Oliv.;* elevatus *Fabr.;* dilatatus *Lec.* (*Scaphinotus flam.*‡Lec.) Scaphinotus heros *Harris* (Bost. Journ. Nat. Hist. 2, 196) belongs to this group: I formerly considered it as identical with C. unicolor, but on comparing the original specimen in the collection of the Academy of Natural Sciences, I find that it differs in having much more convex elytra, being in appearance intermediate between C. unicolor and viduus.

2. Margine thoracis postice vix latiore: C. viduus *Dej.* and Andrewsii *Harris.* C. Leonardi *Harris,* is a variety of the first mentioned.

b. Thorax anguste marginatus.

3. Elytra striata: C. angusticollis *Fischer;* marginatus *Dej.;* ventricosus *Dej. Esch.* (*striatopunctatus* Chaud.;) interruptus *Mén.* (*ventricosus* ‡ Chaud.;) constrictus *Lec.* and cordatus *Lec.;* also C. angulatus *Harris;* cristatus *Harris,* and velutinus *Mén.,* which are unknown to me.

4. Elytra tuberculata: C. tuberculatus *Harris.*

B. Thorax fere rotundatus, tenuiter marginatus (tarsi maris valde dilatati.)

5. C. stenostomus *Weber;* C. nitidicollis; niagarensis; Lecontei; Brevoorti *Lec.* and a new species C. bicarinatus. The second species was first described by Guérin, the third by Laporte, the fourth by Dejean, and the fifth by myself as Sphæroderus.

As a fact in geographical distribution, it may be stated that the species in (B) and (a) are confined to Atlantic North America; those in (b) are only found on the Pacific slope of the continent.

The new species, above mentioned, may be distinguished as follows:

C. constrictus, ater, thorace subopaco, valde cordato, lateribus maxime rotundatis, postice sinuatis, angulis posticis rectis, non prominulis; elytris ventricosis, crenatostriatis, apice acuminatis, interstitiis vix interruptis. Long. ·6.

* Pelophila and Leistus are said to occur in Western North America, but the species are unknown to me.

Two specimens, San Jose, California. Approaches very closely what I consider as C. ventricosus, but the thorax is much more rounded on the sides, which are strongly sinuate towards the posterior angles, while in C. ventricosus they converge obliquely, and are scarcely sinuous in their outline.

C. cordatus, niger, nitidus, thorace cordato, lateribus valde rotundatis, postice sinuatis, angulis posticis rectis, elytris minus convexis, thorace plus sesqui latioribus, apice acuminatis, profunde crenato-striatis, interstitiis vix interruptis. Long. ·48.

One male, San Jose, California. This species is closely allied to the preceding, but in comparing the same sex, the elytra are so much less convex, more parallel, and less declivous at the extremity, that I am obliged to consider them as distinct species.

C. bicarinatus, niger, subpurpurascens, thorace rotundato, latitudine non breviore, basi truncato, punctato, et utrinque valde profunde impresso; elytris æneo-atris, planiusculis, confertim crenato-striatis, versus apicem et latera tuberculis nitidis granulosis, costaque versus marginem acute elevata postice abbreviata, ornatis. Long. ·6.

A fine species, of which I found but a single specimen in Habersham Co., Georgia. It resembles C. niagarensis, but the thorax is not wider than its length; the elytra are more tuberculate posteriorly, and the acutely elevated costa, near the margin, extending from near the base to within one fifth of the apex at first sight distinguishes it.

Nomaretus *Lec.*

Instrumenta cibaria et alia, sicut in Cychris; differt tamen antennarum articulis duobus tertiique basi glabris; tarsi maris antici levissime dilatati; elytra 11-striata.

These species, although very similar to Cychrus, differ so remarkably in the antennæ and the number of striæ of the elytra, that I have thought it necessary to separate them. In Cychrus the first four joints of the antennæ are entirely glabrous, and the elytra have at least fourteen striæ on each.

The three species resemble in appearance the small Cychri from Western America, rather than those of the Atlantic side.

1. N. bilobus, purpureo-æneus, thorace cordato, valde canaliculato, postice valde angustato, basi punctato, et valde transversim impresso, angulis posticis obtusis, elytris striis 11 profundis crenatis, apice confusis. Long. ·52.

Cychrus bilobus Say, Trans. Am. Phil. Soc. 2, 73; Lec. Agass. Lac. Sup. 208, tab. 8, f. 6.
Sphæroderus bilobus Dej. Sp. Gen. 2, 16.

Lake Superior and Ohio.

2. N. fissicollis, niger, nitidus, thorace obovato, valde canaliculato, postice angustato, profunde transversim impresso, angulis posticis obtusis, elytris splendide violaceis, striis 11 profunde crenatis, apice minus impressis. Long. ·42.

One specimen, Illinois; Mr. Willcox. Easily distinguished by the thorax being impunctured, and by the punctures of the striæ of the elytra being larger and less close; the thorax is less narrowed behind than in N. bilobus.

3. N. debilis, niger, nitidus, thorace latitudine longiore, modice canaliculato, cordato, postice

angustato, et lateribus sinuato, basi valde transversim impresso et utrinque exarato, angulis posticis rectis, elytris elongatis, ellipticis, 10-striatis, striis profunde crenatis, 9na indistincta; ore antennisque rufo-piceis. Long. ·38.

A very distinct and singular species, of which I found one specimen in Habersham Co,. Georgia. The basal impressions of the thorax in the other species are small and lost in the deep transverse impression; in this they are long and deep.

Calosoma *Fabr.*

Having inadvertently named a remarkable species of this genus C. angulatum, (Ann. Lyc. 5, 199,) I now propose to change the name to C. prominens, the name first given being preoccupied by Chevrolat for a Mexican species, which also has the sides of the thorax strongly angulated. The two following species are new:

1. C. lugubre, nigrum, nitidum, fronte parce punctata, thorace brevi, lateribus subangulatim valde rotundatis, basi truncato, utrinque late impresso, elytris thorace sesqui latioribus, seriatim punctatis, punctis versus basin maioribus, et rugis transversis coniunctis. Long. 1·08.

One male, from New Braunfels, Texas, collected by Mr. Lindheimer. This species has the form of C. triste *Lec.*, but is much larger; the thorax is more suddenly rounded on the sides, and the three series of impressed foveæ of the elytra are scarcely to be traced; the large punctures of the anterior fourth of the elytra are very conspicuous; all the tibiæ are straight.

2. C. macrum, elongatum, nigrum, nitidum, fronte parce punctata, thorace latitudine sesqui breviore, antrorsum angustato, lateribus rotundatis, postice latius subreflexis, purpurascentibus, basi truncato, utrinque late impresso, elytris thorace vix latioribus, purpureo-marginatis, vix obsoletissime striatis et punctis triplici serie impressis, ante medium vage grosse punctatis. Long. 1·05.

Texas; Lieut. Haldeman and Mr. Lindheimer. This species has the same form as C. externum (*Carab. extern.* Say; *Calos. longipenne* Dej.) It is remarkable for the almost entire absence of the usual striæ and foveæ: the tibiæ are straight in both sexes. The elytra of the male are not wider than the thorax; those of the female are about one third wider.

Nebria *Latr.*

N. Rathvoni, nigra depressa, thorace transverso, marginato, postice magis angustato, lateribus antice valde rotundatis, postice sinuatis, basi punctulato, utrinque impresso, angulis posticis rectis, elytris oblongo-ovatis, striis obsolete punctulatis, interstitio 3io punctis tribus, 7mo punctis quinque impressis. Long. ·48.

Sacramento, California; one specimen collected by Mr. Child and given me by Mr. S. S. Rathvon. This species resembles in form N. Sahlbergii *Fisch.*, but is larger; the thorax is more narrowed behind, and more sinuate on the sides: the striæ of the elytra are deeper, and the punctures are altogether differently placed: in N. Sahlbergii the 3d interstice has five punctures and the 7th none.

Opisthius *Kirby.*

The locality of this singular insect is Oregon, specimens having been brought from there

by the late J. K. Townsend, and by the Exploring Expedition under Capt. Wilkes. Although by the impressions of the elytra it seems related to Elaphrus, and by the form of the thorax to Bembidium, its true affinities are undoubtedly with the present group, on account of the form of the pro- and mesosternum, and the imperfection of the anterior acetabula. It seems to be the true osculant between the Carabica and the water beetles, through Amphizoa: Omophron, though somewhat aquatic in its form and habits, has, as we shall hereafter see, no claims to be considered an osculant genus.

γ. *Elaphri.*

The characters of this group, in the series having the parapleuræ without an appendage, consist in the anterior acetabula being entire, the prosternum not prolonged posteriorly, and the maxillæ towards the base being armed with several long bristles, or spines. This last character exists also in some of the genera of the preceding group: such are, however, readily separated by the form of the anterior acetabula.

The mesosternum is declivous, and usually slightly concave: the anterior tibiæ are more or less emarginate internally, one of the spurs being placed at the tip and the other a short distance above: the paraglossæ are distinct; the first four joints of the antennæ are glabrous. The first three joints of the anterior tarsi of the males are dilated and spongy beneath.

On account of the structure of the epimera of the mesothorax, and the absence of any appendage to the parapleuræ, I have placed Loricera in this group: its strongly bearded maxillæ show its affinity with these insects, nor can I conceive how it has ever been considered as related to Chlænius, or to Panagæus.

Our genera may be thus arranged.

Antennæ verticillato-setosæ; mentum dente lato, obtuso, - -	Loricera *Latr.*
Antennæ simplices; mentum dente longo emarginato:	
Palpi maxillares articulo ultimo præcedente vix sesqui longiore	Blethisa *Bon.*
Palpi maxillares articulo ultimo præcedente plus duplo longiore	Elaphrus *Fabr.*

The genera Opisthius and Notiophilus have been removed from this group to the preceding, on account of the form of the sternum and anterior acetabula.

Of Loricera, there are four species known from North America: L. pilicornis *Latr.* from Lake Superior: L. semipunctata *Esch.* and L. foveata *Lec.* from California, and L. decempunctata *Esch.* from Sitka.

Of Blethisa, Haldeman has described a very large species, B. quadricollis (Proc. Acad. Nat. Sc. 3, 149) found at Lake Superior: Dr. Harris has found the same species near Cambridge, Mass., but it appears to be very rare. A species from Oregon, collected by the late J. K. Townsend, has not yet been described;

B. Oregonensis, æneo-nigra, thorace latitudine breviore, postice leviter angustato, lateribus rotundatis, reflexis, angulis posticis subrectis, ad basin utrinque profunde impresso, carinaque externa munito, elytris profundius striato-punctatis, striis externis confusis, interstitiis convexis, 3io foveis quinque, 5to foveis duabus impressis. Long. ·48.

One female, given me by Mr. Willcox. The posterior angles of the thorax are slightly

obtuse, and not at all rounded. The last joint of the maxillary palpi in Blethisa is relatively so much shorter than in Elaphrus, that I cannot agree with Brullé and Erichson in uniting the two genera.

Elaphrus *Fabr.*

The species of this genus are numerous, and difficult to distinguish: the following classification of those known to me may enable them to be more easily recognised.

A. Elytris interstitiis omnibus lævigatis, impunctatis.

Thorax subtus minus subtiliter punctatus	E. politus *Lec.* Agass. Lac. Sup. 209.
Thorax subtus subtilissime punctatus -	E. lævigatus *Lec.* Ann. Lyc. 5, 200.

B. Thorax minus dense punctatus, elytris interstitiis internis lævibus.

Elytra interstitiis externis parce punctatis	E. cicatricosus *Lec.* Ann. Lyc. 4, 448.
Elytra interstitiis externis et versus apicem dense punctulatis - - -	E. Clairvillei *Kirby*, F. Bor. Am. 62.

C. Thorax et elytra confertissime punctata; his spatiis quadratis lævigatis ornatis.

Maior, thorace transverso, lateribus valde rotundatis	E. intermedius *Kirby*, ibid. 63.
Thorax non transversus, angulis posticis prominulis.	
Thorax subtus, sternum, abdominisque latera subtiliter punctulata - - - -	E. californicus *Man.* Bull. Mosc. 1843.
Thorax subtus, &c., distinctius punctata -	E. punctatissimus *Lec.* Lac. Sup. 210.
Thorax subtus, &c., minus subtiliter punctata	E. ruscarius *Say*, Tr. Am. Ph. Soc. 4, 417.
Thorax non transversus, angulis posticis non prominulis.	
Thorax subtus, &c., distinctius punctata	E. similis *Lec.* Ann. Lyc. 4, 449.

E. sinuatus *Lec.* (Agass. Lac. Sup. 210,) does not appear in the foregoing table; it is closely allied to E. punctatissimus, but differs in having a narrower thorax with less prominent posterior angles; the elytra are narrower and more sinuate on the sides: as, however, there is not an exact agreement in these respects among all my specimens of E. punctatissimus, I am inclined to believe that for the present it is better to suppress the species.

E. ruscarius also shows a considerable variation in the form of the thorax, quite sufficient to account for E. americanus *Dej.* (Sp. Gen. 5, 588.) The elytra of some of the smaller specimens are comparatively much broader than in others, but after a very close examination I can detect no specific difference.

E. fuliginosus *Say*, (Trans. Am. Phil. Soc., 4, 417,) is probably my E. cicatricosus: only the elytra are described, the rest of the specimen having been lost, so that the determination cannot be considered as certain.

E. obscurior *Kirby* is unknown to me.

z. *Omophrones.*

The very different structure of the prosternum requires this to be separated as a distinct group, though Erichson and most other systematic authors have united it with the preceding: Kirby first proposed to form of it a separate family, which he called *Omophronidæ*, without giving any other character than the absence of a scutellum.

It has been considered by Kirby, and by other writers, that this genus makes among

the Carabica the nearest approach to the *Hydradephaga*, Kirby going so far as to assert that "its cognate forms are all in that tribe." With this view I cannot agree. That it is a water type of Carabica, must be admitted from its habits; but when we find the characteristic difference in the position of the anterior legs, which distinguishes the Carabica from the water beetles, is so much exaggerated in Omophron as to produce a form of prosternum not found in any other genus of Carabica, we must consider the integrity of the type as fully preserved, and we must view the resemblances between Omophron and the water beetles as the result of analogy, attending habits of life, and not as displaying any direct affinity. It may be said that neither in the form of the head, the structure of the antennæ, the position of the anterior feet, the shape of the posterior coxæ, nor in the structure of the legs, does Omophron make any approach to Haliplus or Hydroporus.

The true osculant between the Carabica and water beetles will be found in some genus allied to Nebria, as that group alone makes any approach to the latter tribe in the position of the anterior feet: Opisthius on the one side, and Amphizoa, which, as I have attempted to demonstrate,* is a water beetle, with ambulatorial, instead of natatorial legs, make perhaps the nearest osculation that has yet been found.

The special characters of this group are:

The prosternum is wide, prolonged and truncate at the extremity; it is closely applied to the metasternum, so that the mesosternum is concealed: the anterior acetabula are entire, and more distant than usual from the posterior margin of the prosternum, and from each other; the anterior tibiæ have a small deep emargination internally near the tip; the elytra have fourteen deep striæ: the first joint only of the anterior tarsi of the males is dilated; it is large, oblong and densely spongy beneath. The first four joints of the antennæ are glabrous, and the maxillæ are bearded at base, as in the preceding group. The paraglossæ are connate with the ligula.

There are six species of Omophron known to me within the United States, viz.: O. d e n t a t u m *Lec.* (Ann. Lyc. 5, 200;) O. G i l æ *Lec.* ibid.; O. t e s s e l a t u m *Say*, (*Lecontei* Dej.;) O. a m e r i c a n u m *Dej.* (*Sayi* Kirby;) O. l a b i a t u m *Oliv. Say, Dej.*; O. n i t i d u m *Lec.* (Ann. Lyc. 4, 447.)

* Proc. Acad. Nat. Sc. 6, 227.